

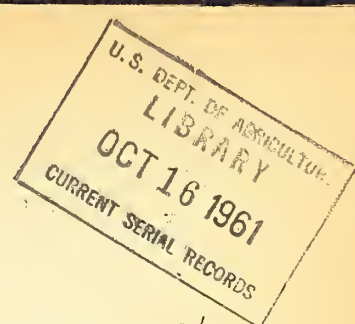
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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Plant Industry
and
Agricultural Marketing Administration



MILLING, BAKING, AND CHEMICAL EXPERIMENTS WITH HARD RED SPRING WHEATS, 1941 CROP^{1/}

by

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INTRODUCTION

Samples of some of the old standard varieties and new hybrid strains of hard red spring wheat, grown in cooperative experiments in the spring wheat region^{2/} of the United States, are milled each year by the United States Department of Agriculture and the flour baked into bread by a number of different methods to determine their quality characteristics. The four regular baking methods used for the 1939 and 1940 crops were continued for most of the experiments and also bromate response methods as used by the Hard Winter Wheat Quality Laboratory and also the Minnesota and North Dakota laboratory methods were used on the eight uniform varieties of both eastern and western composites from the region. In addition, commercial wheat samples are composited and analyzed to obtain similar information on wheat grades from terminal markets, for comparison with varietal samples grown in plot and nursery experiments at agricultural experiment stations.

^{1/} Cooperative investigations of the Division of Cereal Crops and Diseases, Bureau of Plant Industry, and the Grain, Feed and Seed Branch, Agricultural Marketing Administration. The experiments were conducted in the laboratories of the Grain, Feed and Seed Branch, Agricultural Marketing Administration. The samples were obtained from the cooperative experiments with the State Agricultural Experiment Stations in the spring wheat region.

^{2/} Clark, J. A. Results of spring wheat varieties grown in cooperative plot and nursery experiments in the spring wheat region in 1941, with averages for 1939 to 1941. 47 pp.

[Unannb. publication] [Micrographed.] 1942.

The purpose of this report is to make available to cooperators all of the quality data from the 1941 crop obtained from standard varieties, new hybrid strains, and Federal supervision grade samples of hard red spring wheat, together with a summary of previous years' results.

SOURCE OF SAMPLES

The most extensive tests have been made on eastern and western composite samples of each of eight uniform varieties grown in plots at 20 cooperating stations. Station samples from plots grown at St. Paul, Waseca, Morris, and Crookston, Minn.; Fargo, Langdon, and Dickinson, N. Dak.; Brookings and Eureka, S. Dak.; Ames, Iowa; Madison, Wis.; Moccasin and Havre, Mont.; and Sheridan, Wyo.; were tested by the regular methods. Similar tests were made on eastern and western composites of the 26 strains grown in Uniform Regional Nurseries at 18 stations. In addition, samples from North Dakota Intra-State, Montana Intra-State, and Mandan and Langdon, N. Dak., station nurseries were tested. The Federal Grain Supervision samples were assembled from car-lots by grade at Minneapolis, Minn.; Great Falls, Mont.; and Spokane, Wash. Nine composite samples from cars of wheat grading No. 3 or better were obtained from field offices of the Grain, Feed and Seed Branch, Agricultural Marketing Administration, representing the better grades of hard red spring wheat received at these markets.

METHODS USED IN THE BAKING TESTS

Baking tests on the 1941 samples were conducted by the straight dough procedure using the same four baking procedures included in testing the 1939 and 1940 samples, i.e., (No. 1) basic, (No. 2) commercial, (No. 3) commercial-bromate, and (No. 6) commercial-bromate-malted wheat flour, were used for all the varietal samples. Details of the four methods used this year with the various ingredients are shown in table 1.

The baking procedure used is based on the method of the American Association of Cereal Chemists^{3/} with certain modifications deemed necessary for unbleached experimentally milled flour. Because of the size of the mixing bowl, ingredients sufficient for two loaves were mixed at one time. They were mixed a sufficient length of time to properly develop the dough in a Hobart-Swanson dough-mixer (108 R.P.M. with 4 pins in the head and 2 pins in the bowl.) The absorption of the flour was determined by adding the proper amount of water at the time the doughs were mixed. Absorption and mixing time are indicated in the tables. When mixed, the doughs were divided, then rounded in the hands and placed in fermentation graniteware "oatmeal" bowls, measuring 6 inches top diameter, 3 inches bottom diameter, and 2-1/2 inches deep. The punches were made by folding the dough approximately 10 times in the hands. At the end of the fermentation period the dough was molded by a Thompson mechanical roll type "A" moulder with rolls set at a clearance of 3/8 of an inch and the compression plate 1-1/8 inches. The molded doughs were placed in baking pans constructed from 2XX tin known as the tall form. A proofing time of 55 minutes at 86° F and baking time of 25 minutes at 450° F were the same for all the samples. Two loaves of each sample were baked but since the ingredients

3/ 1934 Official American Association of Cereal Chemists. Basic baking test. Cereal Chem. 11: 363-367.

The writers wish to express appreciation for the assistance of Mrs. A. Sallak, Clerk, Division of Cereal Crops and Diseases, in tabulating and checking the data and calculating the standard errors.

were mixed as for one loaf, the two are not duplicates in the sense in which that term is usually used and are not so considered herein. Data given in the tables are averages of the two loaves.

The basic method (No. 1) has been used on all samples starting with the 1929 crop. In 1935, the commercial method (No. 2) was added and in 1936, the commercial-bromate (No. 3). For a part of the samples in 1937, the basic, commercial, and commercial-bromate bakes were made. In 1938, the same bakes as reported in 1937 were made and in addition the (No. 4) malt-phosphato-bromate. In 1939, the current methods, with No. 6 replacing No. 4, were used. The commercial-bromate-malted wheat flour (No. 6) test was first used for part of the 1938 samples and has been continued for all of the 1939 and 1940 samples. This test seems to reveal the maximum strength of the wheats, shown by the larger loaf volumes. This baking formula makes provision for adequate gas production by the employment of sufficient sugar and diastatic supplements.

Table 1. - Baking methods used for samples of the 1941 crop

| Ingredients | Baking methods | | | |
|--|-------------------------|-------------------------|-------------------------|---------------------------------------|
| | No. 1 | No. 2 | No. 3 | No. 6 |
| | Basic | Commercial | Commercial - bromate | Commercial-bromate-malted wheat flour |
| Flour (grams)(13.5 percent moisture basis) | 100.0 | 100.0 | 100.0 | 100.0 |
| Yeast (grams) | 2.0 | 2.0 | 2.0 | 2.0 |
| Salt (grams) | 1.5 | 1.5 | 1.5 | 1.5 |
| Sugar (grams) | 5.0 | 5.0 | 5.0 | 5.0 |
| Potassium Bromate (grams) | | | .001 | .001 |
| Malted wheat flour (grams) | | | | .25 |
| Dried skimmilk (grams) | | 4.0 | 4.0 | 4.0 |
| Shortening (grams) | | 3.0 | 3.0 | 3.0 |
| Water absorption (percent) | proper | proper | proper | proper |
| Mixing time (minutes) | proper for each variety | proper for each variety | proper for each variety | proper for each variety |
| Fermentation time (minutes) | 180 | 180 | 180 | 180 |
| Fermentation periods: | | | | |
| 1st punch after 105 minutes, and | | | | |
| 2nd punch after additional 50 minutes. | | | | |
| Mold after additional 25 minutes. | | | | |
| Proofing time - 55 minutes. | | | | |
| Baked 25 minutes at 230° C. | | | | |

Each year other methods were used for certain samples or varieties. This year special tests were made on eastern and western composites for the eight uniform varieties. The bromate response test used by the Hard Winter Wheat Quality Laboratory for hard red winter wheat and methods used by the Minnesota and North Dakota laboratories were thus used for comparison.

In the following tables, loaf volumes are reported for the different methods of baking used, but only averages are given for absorption, weight, crumb-color, and grain-texture of loaf. The optimum or highest volume for any method, is shown in the tables also, but the varieties are ranked in order of their average volumes for the four different methods. The highest ranking variety with respect to each property is indicated by underlining. Standard errors for loaf volumes have been calculated (Interaction: baking method x variety)

and a double underline is drawn in each table separating those varieties which are significantly lower than the one having the highest average volume in the test.

Since duplicate determinations were not made in most cases, it is not possible to correctly estimate random errors. Four baking methods were used in nearly all cases and it is possible to calculate errors by considering these as replicate bakes. This has been done and the resulting standard error is indicated in each table.

It should be noted that the error calculated in this way is in reality variety x method interaction, and unless used with caution and discretion may lead to erroneous conclusions. Interaction error is never less (within the limits of sampling error) than the true error but may be much greater, depending on whether varieties respond alike or differently to the different baking methods. Inspection of the data indicates that in some cases not all varieties responded alike to the different baking methods from which it may be inferred that the calculated errors (variety x method interaction) are in excess of the true errors. This is in accord with other studies in this laboratory in which true errors have been calculated and found to be in the range of 15 to 20 cc for a single determination.

All test weights were determined in the laboratory on a dockage-free basis. The protein and ash contents and water absorption are reported on a 13.5 percent moisture basis and the flour yield on a moisture-free basis.

EXPERIMENTAL RESULTS

The results for the regular methods on composite and station samples are given in tables 2 to 22, for bromate response in tables 23 and 24, for the Minnesota methods in table 25, and for the North Dakota method in table 26. Tables 27 and 28 summarize the baking results of the different laboratory methods. The results from the commercial samples are shown in table 29. Summaries of the comparable 1941 samples are averaged in table 30 and four years' results in tables 31 and 32. These tables are largely self-explanatory.

Acre yields are included, where comparable, to assist in the interpretation of results. The test weights for most of the composite and station samples were satisfactory.

Regular Methods

The regular baking methods, Nos. 1, 2, 3, and 6, were used as in previous years, for the bulk of the composite and station samples. Tables 2 to 28 contain the detailed results and the milling and chemical data in table 2 are not repeated for the other baking methods.

Table 2. - Yield^{1/}, milling, baking, and chemical results on the uniform varieties of hard red spring wheat grown in plot experiments from (1) eastern and (2) western composites of the 1941 crop

| Variety | C.I. Acre number | Test weight (Lbs.) | Protein content | | Wheat Ash | | Flour | | Water absorption average | Mixing time (Min.) | Baking method and volume of loaf ^{2/} | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------------------------|------------------|--------------------|-----------------|--------------|--------------|------------|------------|------------|--------------------------|--------------------|--|------------|---------------------|----------------|------|-----|--------------------------------|-----------------------------|-------------------------------|
| | | | Wheat (Pct.) | Flour (Pct.) | Yield (Pct.) | Ash (Pct.) | No. 1 (Cc) | No. 2 (Cc) | | | No. 3 (Cc) | No. 6 (Cc) | Opti-min range (Cc) | Avo-range (Cc) | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Eastern Composite ^{3/} | | | | | | | | | | | | | | | | | | | |
| Ceres | 6900 | 19.4 | 55.5 | 13.9 | 13.4 | 1.97 | 66.3 | .69 | 64 | 2.5 | 856 | 976 | 922 | 925 | 976 | 920 | 147 | 80 | 79 |
| Renown | 11947 | 25.2 | 58.5 | 15.7 | 14.6 | 2.00 | 69.2 | .68 | 62 | 2.0 | 824 | 934 | 928 | 933 | 934 | 905 | 147 | 85 | 83 |
| Thatcher | 10003 | 19.8 | 55.4 | 14.0 | 13.7 | 1.86 | 66.9 | .67 | 63 | 2.0 | 841 | 919 | 917 | 928 | 928 | 901 | 148 | 85 | 81 |
| Pilot | 11945 | 29.9 | 57.3 | 14.6 | 13.0 | 2.02 | 67.9 | .59 | 61 | 2.0 | 807 | 928 | 920 | 931 | 931 | 897 | 146 | 85 | 85 |
| Rival | 11708 | 28.6 | 58.0 | 15.3 | 14.2 | 1.96 | 71.4 | .64 | 64 | 2.0 | 809 | 942 | 888 | 914 | 942 | 888 | 148 | 85 | 83 |
| Marquis | 3641 | 14.5 | 53.5 | 14.3 | 13.5 | 2.05 | 66.4 | .72 | 62 | 2.0 | 727 | 899 | 899 | 928 | 928 | 863 | 148 | 83 | 80 |
| Merit | 11870 | 26.9 | 56.1 | 14.8 | 13.7 | 1.97 | 64.1 | .72 | 64 | 2.5 | 758 | 847 | 868 | 930 | 930 | 851 | 149 | 81 | 83 |
| Premier | 11940 | 29.4 | 60.0 | 15.0 | 14.2 | 2.01 | 73.5 | .70 | 64 | 2.0 | 712 | 844 | 847 | 870 | 870 | 818 | 148 | 89 | 83 |
| Average | | 24.2 | 56.8 | 14.7 | 13.8 | 1.98 | 68.2 | .68 | 63 | 2.1 | 792 | 911 | 899 | 920 | 930 | 880 | 148 | 84 | 82 |
| Range | | 15.4 | 6.5 | 1.8 | 1.6 | 0.19 | 9.4 | .13 | 3 | 0.5 | 144 | 132 | 81 | 63 | 106 | 102 | 3 | 9 | 6 |
| Western Composite ^{4/} | | | | | | | | | | | | | | | | | | | |
| Pilot | 11945 | 22.0 | 57.7 | 17.2 | 16.1 | 1.85 | 66.1 | .54 | 60 | 2.0 | 853 | 948 | 980 | 1044 | 1044 | 956 | 145 | 90 | 85 |
| Thatcher | 10003 | 21.9 | 57.2 | 16.9 | 16.4 | 1.84 | 66.9 | .61 | 62 | 2.0 | 824 | 882 | 951 | 982 | 982 | 910 | 147 | 86 | 84 |
| Ceres | 6900 | 20.5 | 59.2 | 16.7 | 15.7 | 1.85 | 66.6 | .57 | 62 | 2.0 | 784 | 856 | 876 | 951 | 951 | 867 | 148 | 88 | 89 |
| Rival | 11708 | 20.7 | 58.5 | 16.4 | 15.3 | 1.77 | 68.4 | .59 | 65 | 2.5 | 727 | 853 | 908 | 948 | 948 | 859 | 149 | 88 | 86 |
| Marquis | 3641 | 15.8 | 55.8 | 15.8 | 15.3 | 1.98 | 66.0 | .73 | 62 | 2.0 | 707 | 829 | 896 | 965 | 965 | 849 | 143 | 84 | 84 |
| Renown | 11947 | 10.6 | 58.9 | 17.0 | 16.1 | 1.87 | 69.2 | .61 | 60 | 2.0 | 707 | 809 | 832 | 937 | 937 | 834 | 140 | 86 | 84 |
| Merit | 11870 | 20.4 | 57.3 | 16.8 | 15.8 | 1.82 | 64.9 | .61 | 65 | 2.0 | 651 | 809 | 871 | 925 | 925 | 814 | 150 | 90 | 81 |
| Premier | 11940 | 21.4 | 59.7 | 16.3 | 15.3 | 1.84 | 68.0 | .60 | 67 | 2.5 | 606 | 746 | 746 | 701 | 701 | 720 | 154 | 86 | 79 |
| Average | | 20.2 | 58.0 | 16.6 | 15.2 | 1.85 | 67.0 | .61 | 63 | 2.1 | 733 | 842 | 809 | 942 | 942 | 851 | 149 | 88 | 85 |
| Range | | 6.2 | 3.9 | 1.4 | 1.1 | 0.21 | 4.3 | .19 | 7 | 0.5 | 245 | 202 | 234 | 263 | 263 | 236 | 9 | 6 | 10 |

^{1/} Average yield of those stations included in the composite.

^{2/} Standard errors (Variety x Method interaction) for a single determination = 23.8 cc for the eastern composites and 23.6 cc for the western composites.

^{3/} Four pounds each from the St. Paul, Waseca, Morris, Crookston, Langdon, Fargo, and Brookings stations. Milled on the Buhler mill and 1/3 of the flour was sent to each of the St. Paul and Fargo laboratories.

^{4/} Four pounds each from the Dickinson, Havre, Moccasin, Sheridan, Alliance, North Platte, and Akron stations. Milled on the Buhler mill and 1/3 of the flour sent to each of the Minnesota and North Dakota laboratories.

Table 3. - Average yield, milling, baking, and chemical results on the eastern and western composites of the uniform varieties of hard red spring wheat grown in plot experiments

| Variety | C. I. number | Acres yield weight (Bu.) (Lbs.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour (Pct.) | | Water absorption average (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---|--------------|---------------------------------|------------------------|--------------|------------------|--------------|------------|---------------------------------|--------------------|----------------------------------|------------|------------|------------|--------------|--------------------|--------------------------------|-----------------------------|-------------------------------|
| | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | Optimum (Cc) | Average range (Cc) | | | |
| | | | | | | | | | | | | | | | | | | |
| Average of Eastern and Western Composites, 1941 | | | | | | | | | | | | | | | | | | |
| Pilot | 11945 | 26.0 | 57.5 | 15.9 | 14.6 | 1.94 | 67.0 | .57 | 61 | 2.0 | 830 | 938 | 950 | 988 | 927 | 146 | 85 | |
| Thatcher | 10003 | 20.9 | 56.3 | 15.5 | 15.1 | 1.85 | 66.9 | .64 | 63 | 2.0 | 833 | 901 | 934 | 955 | 906 | 148 | 83 | |
| Ceres | 6900 | 20.0 | 57.4 | 15.3 | 14.6 | 1.91 | 66.5 | .63 | 63 | 2.3 | 820 | 916 | 899 | 938 | 893 | 143 | 84 | |
| Rival | 11708 | 24.7 | 58.3 | 15.9 | 14.8 | 1.87 | 69.9 | .62 | 65 | 2.3 | 768 | 898 | 898 | 931 | 945 | 149 | 85 | |
| Renown | 11947 | 21.9 | 58.7 | 16.4 | 15.4 | 1.94 | 69.2 | .65 | 61 | 2.0 | 766 | 873 | 905 | 935 | 870 | 143 | 84 | |
| Marquis | 3641 | 15.2 | 54.7 | 15.1 | 14.4 | 2.02 | 66.2 | .73 | 62 | 2.0 | 717 | 864 | 898 | 947 | 857 | 143 | 84 | |
| Merit | 11870 | 23.7 | 56.7 | 15.8 | 14.8 | 1.90 | 64.5 | .67 | 65 | 2.3 | 705 | 828 | 870 | 928 | 833 | 150 | 82 | |
| Premier | 11940 | 25.4 | 59.9 | 15.7 | 14.8 | 1.93 | 70.8 | .65 | 66 | 2.3 | 660 | 795 | 797 | 826 | 770 | 151 | 81 | |
| Average | | 22.2 | 57.4 | 15.7 | 14.8 | 1.92 | 67.6 | .65 | 63 | 2.2 | 762 | 877 | 894 | 931 | 866 | 149 | 84 | |
| Range | | 10.8 | 5.2 | 1.3 | 1.0 | 0.17 | 6.3 | .16 | 5 | 0.3 | 173 | 143 | 153 | 162 | 157 | 5 | 4 | |
| Average of 1939, 1940, and 1941 Composites | | | | | | | | | | | | | | | | | | |
| Pilot | 11945 | 22.3 | 57.1 | 16.1 | 15.0 | 68.9 | | .56 | 64.8 | 2.0 | 795 | 908 | 956 | 980 | 909 | 149 | 86 | |
| Thatcher | 10003 | 21.4 | 56.4 | 16.1 | 15.6 | 69.4 | | .58 | 65.8 | 2.0 | 785 | 880 | 951 | 979 | 899 | 151 | 84 | |
| Ceres | 6900 | 19.3 | 57.6 | 15.6 | 14.9 | 68.9 | | .58 | 66.2 | 2.2 | 769 | 879 | 893 | 923 | 869 | 151 | 86 | |
| Renown | 11947 | 20.0 | 58.3 | 16.4 | 15.6 | 70.1 | | .60 | 64.3 | 2.0 | 729 | 832 | 924 | 955 | 860 | 150 | 86 | |
| Rival | 11708 | 21.9 | 57.6 | 15.7 | 14.8 | 71.0 | | .60 | 66.0 | 2.2 | 715 | 835 | 890 | 929 | 842 | 151 | 87 | |
| Marquis | 3641 | 15.7 | 55.3 | 15.5 | 14.6 | 67.7 | | .64 | 63.1 | 2.0 | 706 | 841 | 892 | 907 | 837 | 149 | 87 | |
| Merit | 11870 | 22.0 | 56.4 | 16.0 | 15.0 | 68.2 | | .62 | 68.6 | 2.3 | 676 | 802 | 878 | 930 | 824 | 154 | 82 | |
| Premier | 11940 | 22.8 | 59.3 | 15.5 | 14.7 | 71.1 | | .60 | 67.7 | 2.2 | 657 | 790 | 830 | 873 | 766 | 154 | 85 | |
| Average | | 20.7 | 57.3 | 15.9 | 15.0 | 69.4 | | .60 | 65.8 | 2.1 | 729 | 846 | 902 | 936 | 853 | 151 | 85 | |
| Range | | 7.1 | 4.0 | 0.9 | 1.0 | 3.4 | | .08 | 5.5 | 0.3 | 133 | 116 | 126 | 106 | 121 | 5 | 5 | |

1/ Standard errors (Variety x Method interaction) for a single determination = 19.7 cc for the eastern and western composites in 1941; and 16.5 cc for the 1939, 1940, and 1941 composites.

Table 4. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at St. Paul, Minn., in 1941

| Variety. | Nursery num- ber | C.I. number | Acre yield | Test weight | Protein content | | Wheat ash | Flour | | Water absorp- tion average time | Baking method and volume of loaf | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) | | | | | | | |
|----------------------|---------------------|----------------|---------------|----------------|--------------------|--------|--------------|--------|--------|---|-------------------------------------|------|--------|--------|--------|--|--------------------------------------|--|---------|---------------|---------------|---------------|---------------|----------------------|-----------------------|
| | | | | | Wheat Flour | (Pct.) | | (Pct.) | (Pct.) | | Yield | Ash | (Pct.) | (Pct.) | (Pct.) | | | | (Cc) | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | Opti- mum (Cc) | Ave- range (Cc) |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | (Bu.) | (Lbs.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Min.) | (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | (Grams) | (Score) | (Score) | | | | | |
| Hx2 ² | II-31-14 | 12044 | 33.1 | 55.5 | 15.7 | 15.0 | 2.19 | 71.5 | .57 | 63 | 835 | 920 | 905 | 942 | 942 | 901 | 143 | 85 | 89 | | | | | | |
| Hx2 ² | II-31-9 | 12251 | 30.7 | 55.5 | 15.3 | 14.9 | 2.11 | 71.5 | .57 | 63 | 812 | 900 | 911 | 945 | 945 | 894 | 147 | 89 | 88 | | | | | | |
| Regent | R.L. 975.6 | 12070 | 26.4 | 56.2 | 15.8 | 15.1 | 2.00 | 71.0 | .58 | 63 | 749 | 832 | 948 | 1015 | 1015 | 886 | 148 | 86 | 85 | | | | | | |
| Hx2 ² | II-31-6 | 12043 | 33.3 | 56.8 | 15.8 | 14.5 | 2.11 | 69.6 | .53 | 65 | 826 | 893 | 886 | 891 | 893 | 874 | 149 | 88 | 86 | | | | | | |
| Renown | R.L. 716.6 | 11947 | 28.4 | 58.9 | 15.6 | 14.5 | 1.98 | 70.6 | .54 | 63 | 781 | 885 | 908 | 920 | 920 | 874 | 148 | 88 | 90 | | | | | | |
| Thatcher | ---- | 10003 | 19.1 | 53.2 | 14.4 | 13.6 | 1.94 | 68.0 | .52 | 63 | 801 | 894 | 879 | 919 | 919 | 873 | 147 | 78 | 86 | | | | | | |
| Mx3 ² | 1597 | 12053 | 31.5 | 55.1 | 14.9 | 14.3 | 1.97 | 69.2 | .64 | 65 | 735 | 868 | 853 | 885 | 885 | 830 | 149 | 92 | 90 | | | | | | |
| H-44xT4 | II-29-52 | 11890 | 32.5 | 55.2 | 14.6 | 13.5 | 1.97 | 70.1 | .51 | 63 | 706 | 856 | 821 | 871 | 871 | 814 | 148 | 85 | 85 | | | | | | |
| MxG-101G | Ns. 2822 | 12071 | 31.2 | 56.2 | 15.0 | 13.9 | 1.98 | 72.9 | .57 | 63 | 688 | 806 | 847 | 891 | 891 | 808 | 150 | 89 | 84 | | | | | | |
| Merit-3 | 1348-3 | 12036 | 31.3 | 54.5 | 14.3 | 13.3 | 1.96 | 70.2 | .53 | 65 | 620 | 803 | 856 | 905 | 905 | 796 | 150 | 84 | 86 | | | | | | |
| Merit | 1343 | 11070 | 29.9 | 55.6 | 14.4 | 13.2 | 1.96 | 69.6 | .50 | 67 | 620 | 815 | 835 | 876 | 876 | 787 | 153 | 89 | 86 | | | | | | |
| C.DCxCH ² | Ns. 2829 | 12008 | 31.4 | 60.0 | 15.5 | 14.2 | 2.11 | 72.0 | .63 | 63 | 700 | 803 | 806 | 812 | 812 | 780 | 149 | 89 | 84 | | | | | | |
| Pilot | 1098-13 | 11945 | 32.8 | 57.8 | 13.8 | 12.5 | 1.94 | 69.2 | .51 | 63 | 669 | 823 | 798 | 798 | 823 | 772 | 150 | 83 | 86 | | | | | | |
| Premier | Ns. 2772 | 11940 | 30.6 | 60.0 | 14.7 | 13.8 | 2.11 | 72.0 | .62 | 67 | 620 | 784 | 772 | 798 | 798 | 744 | 153 | 89 | 85 | | | | | | |
| Rival | Ns. 2634 | 11708 | 30.9 | 58.2 | 14.2 | 13.1 | 1.94 | 70.7 | .55 | 63 | 646 | 764 | 752 | 798 | 798 | 740 | 150 | 83 | 86 | | | | | | |
| Average | | | 30.2 | 56.6 | 15.0 | 14.0 | 2.02 | 70.5 | .57 | 64 | 721 | 844 | 852 | 884 | 886 | 825 | 149 | 87 | 86 | | | | | | |
| Range | | | 6.9 | 6.8 | 2.0 | 2.6 | 0.25 | 4.9 | .13 | 4 | 215 | 156 | 196 | 217 | 217 | 161 | 6 | 14 | 6 | | | | | | |

1/ Standard error (Variety x Method interaction) for a single determination = 32.5 cc.

2/ Hope x Thatcher.

3/ Merit x Thatcher.

4/ H-44 x Thatcher.

5/ Mercury x Comet-N. No. 1010.

6/ Ceres-Double Cross x Ceres-Hope-Florence.

Table 5. -- Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at Wasco, Minn., in 1941

| Variety | Nursery number | C.I. number | Acres yield | Test weight (lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|------------|----------------|-------------|-------------|--------------------|-----------------|-------|------------------|-------|-----|-------------------------|--------------------|----------------------------------|------------|------------|------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | Yield | Ash | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | | | |
| Hx2/ | IL-31-14 | 12044 | 27.1 | 52.5 | 15.9 | 15.1 | 2.22 | 69.8 | .57 | 63 | 2.0 | 829 | 923 | 997 | 1009 | 940 | 145 | 86 |
| Hx2/ | IL-31-9 | 12251 | 28.0 | 53.7 | 15.9 | 15.1 | 2.29 | 70.2 | .59 | 65 | 2.0 | 813 | 923 | 957 | 934 | 957 | 147 | 89 |
| Pilot | 1090-13 | 11945 | 29.6 | 55.1 | 14.5 | 13.3 | 2.09 | 68.7 | .53 | 63 | 2.0 | 773 | 900 | 943 | 939 | 943 | 146 | 83 |
| Renown | R.L.716.6 | 11947 | 21.3 | 56.7 | 14.9 | 14.1 | 2.09 | 69.7 | .55 | 63 | 2.0 | 780 | 873 | 939 | 948 | 885 | 145 | 88 |
| Thatcher | ----- | 10003 | 16.2 | 54.3 | 14.3 | 13.4 | 2.03 | 70.7 | .53 | 63 | 2.0 | 814 | 859 | 923 | 917 | 923 | 146 | 89 |
| MrT3/ | 1597 | 12053 | 25.6 | 53.9 | 14.8 | 14.1 | 2.11 | 69.2 | .57 | 67 | 2.5 | 724 | 850 | 923 | 951 | 862 | 151 | 91 |
| H-44xT4/ | IL-28-61 | 11791 | 25.7 | 54.4 | 15.0 | 14.1 | 2.04 | 69.7 | .48 | 65 | 2.5 | 755 | 891 | 890 | 899 | 859 | 147 | 89 |
| H-44xT4/ | IL-29-52 | 11890 | 34.2 | 54.5 | 14.7 | 13.7 | 2.07 | 70.7 | .53 | 63 | 2.0 | 732 | 859 | 914 | 923 | 923 | 146 | 85 |
| Regent | R.L.975.6 | 12070 | 24.7 | 56.0 | 15.6 | 15.2 | 2.13 | 70.4 | .60 | 63 | 2.0 | 712 | 812 | 917 | 956 | 849 | 147 | 85 |
| CDCxHFFS/ | Ns.2829 | 12008 | 28.4 | 58.7 | 15.2 | 14.0 | 2.20 | 71.3 | .60 | 63 | 2.0 | 743 | 841 | 891 | 832 | 839 | 148 | 91 |
| Rival | Ns.2634 | 11703 | 28.5 | 57.5 | 14.5 | 13.6 | 2.00 | 71.1 | .61 | 67 | 2.0 | 740 | 868 | 853 | 835 | 837 | 149 | 93 |
| Merit-3 | 1348-3 | 12036 | 22.8 | 52.5 | 14.5 | 13.6 | 2.11 | 69.4 | .50 | 60 | 2.5 | 665 | 809 | 873 | 908 | 814 | 152 | 79 |
| McC-10105/ | Ns.2022 | 12071 | 24.4 | 55.0 | 15.3 | 14.1 | 2.02 | 71.1 | .56 | 65 | 2.0 | 632 | 798 | 888 | 920 | 811 | 151 | 80 |
| Merit | 1348 | 11870 | 23.8 | 53.6 | 14.4 | 13.4 | 2.07 | 69.8 | .61 | 67 | 2.5 | 654 | 809 | 862 | 893 | 805 | 151 | 85 |
| Premier | Ns.2772 | 11940 | 25.0 | 57.6 | 15.0 | 14.1 | 2.25 | 70.8 | .64 | 65 | 2.0 | 663 | 795 | 853 | 832 | 853 | 149 | 88 |
| Average | | | 25.7 | 55.1 | 15.0 | 14.1 | 2.12 | 70.2 | .57 | 65 | 2.1 | 736 | 855 | 900 | 920 | 855 | 143 | 84 |
| Range | | | 18.0 | 6.2 | 1.6 | 1.9 | 0.23 | 3.1 | .16 | 5 | 0.5 | 191 | 133 | 144 | 177 | 156 | 7 | 13 |

1/ Standard error (Variety x Method interaction) for a single determination = 26.4 cc.

2/ Hope x Thatcher.

3/ Merit x Thatcher.

4/ H-44 x Thatcher.

5/ Ceres-Douglas Cross x Ceres-Hope-Florence.

6/ Mercury x Comet-N. No. 1018.

Table 6. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at Morris, Minn., in 1941

| Variety | Nursery number | C.I. number | Acre yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour (Pct.) | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------------|----------------------|----------------|------------------|--------------------|-----------------|--------------|------------------|--------------|------------|-------------------------|--------------------|----------------------------------|------------|-------------|---------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No.1 (Cc) | No.2 (Cc) | No.3 (Cc) | Opti-mum (Cc) | | | |
| | | | | | | | | | | | | | | | | | | |
| Regent HxT2 | R.L.975.6 11-31-6 | 12070 12043 | 24.7 30.0 | 55.6 55.3 | 15.3 16.1 | 14.7 15.4 | 2.00 2.02 | 70.4 70.7 | 51 60 | 65 63 | 2.0 2.0 | 755 815 | 905 923 | 1035 899 | 1061 936 | 939 893 | 86 89 | 88 90 |
| Renown | R.L.716.6 | 11947 | 23.7 | 57.5 | 15.1 | 14.2 | 1.95 | 71.3 | 53 | 63 | 2.0 | 775 | 841 | 959 | 976 | 888 | 90 | 91 |
| Pilot | 1098-13 | 11945 | 30.4 | 55.5 | 14.5 | 13.2 | 1.98 | 69.6 | 56 | 63 | 2.0 | 815 | 911 | 899 | 925 | 888 | 85 | 86 |
| HxT2 | 11-31-14 | 12044 | 29.9 | 54.3 | 15.5 | 14.9 | 1.96 | 69.7 | 55 | 63 | 2.0 | 758 | 873 | 920 | 974 | 881 | 88 | 93 |
| Thatcher | --- | 10003 | 18.4 | 53.9 | 14.3 | 13.2 | 2.00 | 70.0 | 52 | 65 | 2.0 | 755 | 873 | 920 | 939 | 872 | 83 | 90 |
| MxT3 | 1597 | 12053 | 25.1 | 55.0 | 15.3 | 14.6 | 1.98 | 68.9 | 65 | 67 | 2.5 | 694 | 859 | 925 | 957 | 859 | 89 | 86 |
| Merit-3 | 1348-3 | 12036 | 22.5 | 52.3 | 15.2 | 14.5 | 2.07 | 69.7 | 63 | 68 | 2.5 | 703 | 827 | 919 | 965 | 854 | 83 | 84 |
| Merit | 1348 | 11870 | 25.8 | 53.7 | 14.4 | 13.4 | 1.99 | 69.5 | 56 | 66 | 2.0 | 700 | 812 | 888 | 914 | 829 | 88 | 88 |
| Rival | Ns.2634 | 11708 | 28.5 | 56.7 | 14.5 | 13.5 | 2.00 | 71.0 | 53 | 67 | 2.5 | 694 | 832 | 876 | 911 | 828 | 91 | 90 |
| CD-CFF ⁴ | Ns.2829 | 12008 | 26.2 | 59.1 | 15.1 | 14.0 | 2.11 | 71.1 | 59 | 63 | 2.0 | 713 | 835 | 879 | 863 | 879 | 89 | 89 |
| H-44xT5 | 11-28-61 | 11791 | 27.3 | 56.1 | 14.5 | 13.5 | 2.05 | 71.4 | 58 | 63 | 2.0 | 740 | 850 | 829 | 876 | 824 | 91 | 88 |
| MxC-10186 | Ns.2822 | 12071 | 24.7 | 56.4 | 15.0 | 14.3 | 1.95 | 71.7 | 57 | 66 | 2.0 | 663 | 812 | 868 | 908 | 813 | 89 | 85 |
| H-44xT5 | 11-29-52 | 11890 | 32.6 | 55.4 | 14.6 | 13.5 | 1.90 | 70.4 | 53 | 63 | 2.0 | 712 | 818 | 841 | 873 | 811 | 83 | 90 |
| Premier | Ns.2772 | 11940 | 27.5 | 59.3 | 14.6 | 13.7 | 2.04 | 72.0 | 60 | 66 | 2.0 | 605 | 741 | 809 | 859 | 754 | 86 | 85 |
| Average | | | 26.5 | 55.7 | 14.9 | 14.0 | 2.00 | 70.5 | 57 | 65 | 2.1 | 726 | 847 | 898 | 929 | 850 | 87 | 88 |
| Range | | | 14.2 | 7.0 | 1.8 | 2.2 | 0.21 | 3.1 | 14 | 5 | 0.5 | 210 | 182 | 226 | 202 | 185 | 8 | 7 |

1/ Standard error (Variety x Method interaction) for a single determination = 31.1 cc.
2/ Hope x Thatcher.
3/ Merit x Thatcher.
4/ Ceres-Double Cross x Ceres-Hope-Florence.
5/ H-44 x Thatcher.
6/ Mercury² x Comet-N.No. 1018.

Table 7. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at Crookston, Minn., in 1941

| Variety | Nursery number | C.I. number | Acre yield (Bu.) | Test weight (Lbs.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour Yield (Pct.) | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|-----------------------|----------------|-------------|------------------|--------------------|------------------------|-------|------------------|--------------------|-------------------------|--------------------|----------------------------------|-------|-------|-------|-----------|------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | | | | No. 1 | No. 2 | No. 3 | No. 6 | Opti- mum | Ave- range | | | |
| Thatcher | --- | 10003 | 21.8 | 53.7 | 14.1 | 13.5 | 1.97 | 68.4 | 50 | 2.5 | 801 | 962 | 1006 | 976 | 1006 | 936 | 146 | 71 | 81 |
| HxP ² | 11-31-9 | 12251 | 34.7 | 55.7 | 16.4 | 15.6 | 2.04 | 69.8 | 60 | 2.0 | 823 | 1000 | 945 | 1000 | 920 | 920 | 147 | 81 | 83 |
| HxT ² | 11-31-14 | 12044 | 34.5 | 56.0 | 15.6 | 14.7 | 2.00 | 70.8 | 58 | 2.0 | 830 | 966 | 945 | 962 | 963 | 920 | 145 | 81 | 85 |
| Ransom | R.L. 716-6 | 11947 | 31.2 | 58.8 | 15.4 | 14.5 | 2.05 | 70.6 | 59 | 2.0 | 806 | 925 | 977 | 997 | 997 | 926 | 146 | 83 | 89 |
| HxT ² | 11-31-6 | 12043 | 32.1 | 56.1 | 16.2 | 15.3 | 1.97 | 69.9 | 59 | 2.0 | 787 | 954 | 971 | 913 | 954 | 896 | 143 | 86 | 84 |
| HxT ³ | 1597 | 12053 | 35.8 | 57.1 | 15.1 | 14.5 | 2.03 | 70.3 | 59 | 2.0 | 712 | 838 | 942 | 948 | 948 | 860 | 150 | 90 | 93 |
| Rival | Ms. 2634 | 11708 | 26.6 | 57.7 | 15.2 | 14.2 | 2.05 | 72.6 | 59 | 3.0 | 719 | 908 | 896 | 914 | 914 | 859 | 147 | 85 | 88 |
| HxC-1018 ⁴ | Ms. 2822 | 12071 | 34.9 | 58.5 | 15.4 | 14.8 | 1.93 | 72.2 | 57 | 2.0 | 709 | 885 | 905 | 914 | 914 | 853 | 150 | 89 | 89 |
| Regent | R.L. 975-6 | 12070 | 30.6 | 58.4 | 14.6 | 13.7 | 1.96 | 70.7 | 50 | 2.0 | 735 | 836 | 923 | 913 | 923 | 852 | 147 | 89 | 85 |
| Merit | 1348 | 11870 | 29.2 | 55.5 | 15.3 | 14.9 | 2.10 | 70.5 | 64 | 2.5 | 660 | 841 | 905 | 950 | 950 | 841 | 150 | 83 | 84 |
| Premier | Ms. 2772 | 11940 | 32.2 | 59.0 | 15.6 | 14.6 | 2.00 | 71.1 | 63 | 2.5 | 697 | 841 | 844 | 867 | 867 | 812 | 151 | 86 | 85 |
| H-14xT ⁵ | 11-28-52 | 11000 | 37.5 | 55.5 | 14.7 | 13.2 | 2.02 | 70.5 | 52 | 3.0 | 675 | 859 | 841 | 829 | 850 | 801 | 149 | 83 | 85 |
| CDxGTS | Ms. 2029 | 12003 | 30.9 | 60.1 | 15.1 | 13.9 | 2.12 | 71.7 | 59 | 2.0 | 680 | 844 | 812 | 847 | 847 | 796 | 140 | 89 | 80 |
| Merit-3 | 1340-3 | 12036 | 25.4 | 54.3 | 15.7 | 14.3 | 2.12 | 69.4 | 61 | 2.5 | 623 | 775 | 860 | 905 | 905 | 793 | 152 | 83 | 83 |
| Pilot | 1098-13 | 11945 | 20.8 | 50.1 | 12.9 | 12.5 | 2.06 | 69.4 | 53 | 2.5 | 651 | 821 | 844 | 829 | 844 | 786 | 143 | 84 | 91 |
| Average | | | 31.1 | 57.0 | 15.2 | 14.3 | 2.03 | 70.5 | 58 | 2.3 | 723 | 834 | 906 | 915 | 927 | 859 | 140 | 84 | 86 |
| Range | | | 15.7 | 6.4 | 3.5 | 3.1 | 0.19 | 4.2 | 10 | 1.0 | 129 | 225 | 194 | 160 | 162 | 150 | 7 | 19 | 12 |

1/ Standard error (Variety x Method interaction) for a single determination = 31.2 cc.

2/ Hope x Thatcher³.

3/ Merit x Thatcher.

4/ Mercury² x Comet-N.No. 1018.

5/ H-41 x Thatcher.

6/ Ceres-Double Cross x Ceres-Hope-Florence.

Table 8. - Yield, milling, baking, and chemical results obtained on 34 hard red spring wheats grown in plot experiments at Fargo, N. Dak., in 1941

| Variety | Nursery number | C. I. number | Acro yield (Bu.) | Test weight (lbs.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour (Pct.) | | Water absorption average time (Min.) | Baking method and volume of loaf (Cc) | | | | Average Weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) | |
|--------------------------------|----------------|--------------|------------------|--------------------|------------------------|--------------|------------------|--------------|------------|--------------------------------------|---------------------------------------|------------|------------|------------|--------------------------------|-----------------------------|-------------------------------|--------------|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | Mixing time (Min.) | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | | | | Optimum (Cc) |
| | | | | | | | | | | | | | | | | | | |
| Regular plots | | | | | | | | | | | | | | | | | | |
| Regent | R.L. 975.6 | 12070 | 22.2 | 58.5 | 15.0 | 14.5 | 2.16 | 70.0 | .53 | 63 | 2.0 | 721 | 868 | 896 | 891 | 896 | 844 | 88 |
| Renown | R.L. 716.6 | 11947 | 26.8 | 59.9 | 15.0 | 14.2 | 1.95 | 70.3 | .38 | 63 | 2.0 | 710 | 835 | 856 | 876 | 876 | 819 | 83 |
| H x T3 | II-31-14 | 12044 | 26.1 | 57.5 | 14.9 | 14.5 | 2.02 | 70.9 | .59 | 65 | 2.0 | 719 | 838 | 809 | 879 | 879 | 811 | 84 |
| Merit | 1348 | 11870 | 26.6 | 58.7 | 13.5 | 12.7 | 1.92 | 70.0 | .59 | 68 | 2.0 | 680 | 795 | 807 | 806 | 807 | 772 | 83 |
| Thatcher | 10003 | 22.0 | 57.1 | 13.9 | 13.3 | 1.90 | 70.0 | .43 | .63 | 63 | 2.0 | 680 | 789 | 803 | 815 | 815 | 772 | 88 |
| Pilot | 1098-13 | 11945 | 30.9 | 58.6 | 13.9 | 13.0 | 1.85 | 69.9 | .59 | 63 | 2.0 | 682 | 770 | 770 | 795 | 832 | 772 | 86 |
| Merit x T | 1597 | 12053 | 27.6 | 57.4 | 14.2 | 13.3 | 1.96 | 69.3 | .54 | 65 | 2.0 | 635 | 792 | 821 | 809 | 821 | 764 | 90 |
| Pilot-B | 1098-B | 11428 | 29.1 | 58.9 | 13.9 | 13.2 | 1.91 | 69.6 | .60 | 64 | 2.0 | 666 | 787 | 792 | 803 | 803 | 762 | 88 |
| M x C-1018 | Ns. 2822 | 12071 | 28.9 | 58.0 | 13.9 | 13.2 | 1.89 | 71.6 | .53 | 63 | 2.0 | 641 | 775 | 784 | 778 | 784 | 745 | 89 |
| Merit-3 | 1348-3 | 12036 | 29.1 | 57.1 | 13.9 | 13.1 | 1.99 | 70.9 | .56 | 65 | 2.0 | 596 | 764 | 812 | 806 | 812 | 745 | 83 |
| Ceres x P | 1552 | 12077 | 25.6 | 57.7 | 13.6 | 12.6 | 1.97 | 68.8 | .53 | 63 | 2.0 | 602 | 780 | 789 | 787 | 789 | 740 | 83 |
| H-44 x T | II-28-61 | 11791 | 28.0 | 58.0 | 14.8 | 14.0 | 2.05 | 70.0 | .49 | 63 | 2.0 | 640 | 749 | 767 | 764 | 764 | 735 | 85 |
| R-H x C-1121 | 1520 | 12050 | 27.4 | 60.1 | 13.8 | 12.7 | 2.00 | 71.0 | .47 | 63 | 2.0 | 584 | 775 | 760 | 764 | 775 | 721 | 85 |
| H-44 x T | II-29-52 | 11890 | 28.0 | 57.8 | 14.8 | 13.7 | 1.96 | 70.2 | .51 | 63 | 2.0 | 635 | 767 | 724 | 715 | 767 | 710 | 85 |
| Marquis | 3641 | 17.2 | 55.1 | 12.6 | 12.1 | 2.00 | 68.1 | .56 | .63 | 63 | 2.0 | 596 | 749 | 735 | 753 | 753 | 710 | 86 |
| Ceres | 6900 | 23.6 | 58.3 | 12.7 | 12.1 | 2.00 | 70.0 | .59 | .65 | 65 | 2.0 | 576 | 752 | 716 | 749 | 752 | 698 | 85 |
| C-1110 x H-C | 1596 | 12052 | 29.1 | 60.4 | 13.0 | 12.3 | 1.82 | 73.2 | .61 | 64 | 2.0 | 567 | 723 | 758 | 737 | 758 | 696 | 81 |
| Rival | Ns. 2634 | 11708 | 28.0 | 60.6 | 14.2 | 13.3 | 2.17 | 71.6 | .52 | 66 | 2.0 | 567 | 729 | 732 | 749 | 749 | 694 | 80 |
| Vesta | Ns. 2592 | 11712 | 25.4 | 60.4 | 13.7 | 12.9 | 1.96 | 72.1 | .54 | 63 | 2.0 | 567 | 743 | 721 | 737 | 743 | 692 | 80 |
| CDC x CHF | Ns. 2829 | 12008 | 28.0 | 61.4 | 14.4 | 13.4 | 1.97 | 70.9 | .51 | 63 | 2.0 | 593 | 680 | 694 | 706 | 706 | 663 | 83 |
| Premier | Ns. 2772 | 11940 | 26.8 | 61.3 | 14.6 | 13.2 | 1.91 | 72.1 | .58 | 68 | 2.0 | 578 | 691 | 707 | 695 | 707 | 663 | 85 |
| CDC x CHF | Ns. 2804 | 12029 | 28.3 | 58.0 | 14.2 | 12.9 | 1.95 | 71.2 | .57 | 63 | 2.0 | 529 | 660 | 646 | 710 | 710 | 636 | 79 |
| CDC x CHF | Ns. 2854 | 12252 | 30.8 | 61.9 | 14.0 | 13.0 | 1.91 | 71.6 | .49 | 64 | 2.0 | 556 | 669 | 655 | 660 | 669 | 635 | 79 |
| M x H-44-C | Ns. 2946 | 12253 | 20.4 | 61.2 | 14.2 | 12.8 | 1.90 | 71.4 | .49 | 65 | 2.0 | 515 | 603 | 657 | 632 | 657 | 603 | 74 |
| Average | | | 26.8 | 58.9 | 14.0 | 13.2 | 1.87 | 70.5 | .54 | 64 | 2.0 | 618 | 756 | 759 | 763 | 777 | 725 | 84 |
| Range | | | 13.7 | 6.0 | 2.4 | 2.4 | 0.26 | 7.1 | .23 | 5 | --- | 206 | 260 | 250 | 259 | 239 | 241 | 15 |
| Increase plots of varying size | | | | | | | | | | | | | | | | | | |
| H-HH-44-C | 1595 | 12195 | 59.1 | 14.5 | 13.6 | 2.07 | 69.3 | .53 | 63 | 2.0 | 602 | 772 | 761 | 706 | 786 | 730 | 84 | 84 |
| C-1121 x CHF | 1523 | 12047 | 60.4 | 14.0 | 13.2 | 2.11 | 71.1 | .57 | 63 | 2.0 | 605 | 761 | 769 | 770 | 770 | 726 | 86 | 86 |
| C-1121 x CHF | 1593 | 12193 | 59.7 | 13.0 | 11.7 | 1.89 | 72.1 | .49 | 63 | 2.0 | 584 | 742 | 743 | 727 | 743 | 699 | 85 | 86 |
| --- | Ns. 2988 | --- | 60.5 | 14.2 | 13.3 | 2.00 | 70.7 | .49 | 65 | 2.0 | 562 | 701 | 724 | 740 | 740 | 682 | 84 | 83 |
| --- | Ns. 3000 | --- | 60.6 | 14.0 | 13.0 | 1.91 | 71.6 | .55 | 65 | 2.0 | 568 | 703 | 689 | 697 | 703 | 664 | 89 | 79 |
| CDC x CHF | Ns. 2989 | 12269 | 61.5 | 13.2 | 11.9 | 1.87 | 70.9 | .58 | 67 | 2.0 | 523 | 694 | 638 | 675 | 694 | 633 | 84 | 80 |
| Fields of varying size | | | | | | | | | | | | | | | | | | |
| Thatcher | 10003 | --- | 54.5 | 14.8 | 14.2 | 2.13 | 70.2 | .66 | 63 | 2.0 | 786 | 897 | 923 | 963 | 968 | 894 | 89 | 89 |
| --- | Ns. 2804.57 | --- | 56.2 | 14.6 | 13.5 | 2.07 | 71.0 | .62 | 63 | 2.0 | 632 | 809 | 781 | 859 | 859 | 770 | 86 | 89 |
| --- | Ns. 2804.45 | --- | 55.5 | 14.3 | 13.0 | 2.09 | 71.5 | .60 | 65 | 2.0 | 581 | 815 | 795 | 826 | 826 | 754 | 83 | 89 |
| --- | Ns. 2982 | --- | 56.2 | 15.0 | 13.9 | 1.95 | 72.9 | .59 | 63 | 2.0 | 617 | 740 | 795 | 826 | 826 | 745 | 86 | 89 |

1/ Standard error (Variety x Method interaction) for a single determination = 20.3 cc.

Table 9. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at Langdon, N. Dak., in 1941

| Variety | Nursery number | C. I. number | Acro yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour Yield (Pct.) | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|-------------|----------------|--------------|------------------|--------------------|-----------------|--------------|------------------|--------------------|------------|-------------------------|--------------------|----------------------------------|------------|----------------|-----------------|------|------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | No. 1 (Cc) | No. 2 (Cc) | | | No. 3 (Cc) | No. 6 (Cc) | Opti. min (Cc) | Ave. range (Cc) | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Regent | R. L. 975.6 | 12070 | 34.1 | 57.4 | 16.2 | 15.2 | 1.66 | 70.2 | .45 | 63 | 2.0 | 931 | 1056 | 1032 | 1024 | 1053 | 1011 | 146 | 84 | 80 |
| Pilot-B | 1093-B | 11423 | 33.9 | 56.2 | 15.5 | 14.4 | 1.83 | 63.4 | .43 | 63 | 2.0 | 850 | 1041 | 1024 | 1036 | 1041 | 988 | 148 | 89 | 83 |
| Rival | Ns. 2634 | 11708 | 36.4 | 56.8 | 15.5 | 14.1 | 1.71 | 70.0 | .43 | 63 | 2.0 | 853 | 971 | 994 | 982 | 994 | 950 | 147 | 86 | 84 |
| Renown | R. L. 716.6 | 11947 | 30.6 | 59.7 | 15.5 | 14.8 | 1.71 | 70.1 | .45 | 63 | 2.0 | 853 | 971 | 951 | 1003 | 1003 | 945 | 146 | 85 | 86 |
| Pilot | 1098-13 | 11945 | 36.0 | 56.3 | 15.3 | 14.6 | 1.83 | 68.1 | .40 | 63 | 2.0 | 830 | 968 | 985 | 976 | 985 | 940 | 147 | 90 | 83 |
| M x T2/ | 1597 | 12053 | 36.2 | 56.0 | 15.9 | 15.1 | 1.84 | 69.9 | .48 | 65 | 2.0 | 752 | 911 | 1030 | 1041 | 1041 | 934 | 149 | 89 | 83 |
| Thatcher | ----- | 10003 | 25.5 | 56.2 | 14.7 | 14.0 | 1.67 | 67.6 | .39 | 63 | 2.0 | 856 | 968 | 925 | 957 | 968 | 927 | 147 | 88 | 84 |
| CDC x CHB3/ | Ns. 2804 | 12029 | 37.1 | 56.6 | 15.8 | 14.5 | 1.82 | 70.7 | .45 | 63 | 2.0 | 862 | 930 | 977 | 931 | 977 | 925 | 147 | 90 | 84 |
| McC-10184/ | Ns. 2822 | 12071 | 37.3 | 58.1 | 15.8 | 14.6 | 1.51 | 71.5 | .40 | 63 | 2.0 | 859 | 957 | 920 | 933 | 957 | 917 | 150 | 90 | 84 |
| Merit-3 | 1340-3 | 12036 | 34.3 | 55.2 | 15.9 | 14.0 | 1.90 | 70.5 | .43 | 63 | 2.0 | 709 | 951 | 943 | 939 | 951 | 906 | 149 | 85 | 84 |
| CDC x CHB3/ | Ns. 2829 | 12008 | 37.6 | 59.9 | 16.1 | 14.6 | 1.65 | 70.2 | .35 | 63 | 2.0 | 812 | 942 | 925 | 936 | 942 | 904 | 148 | 93 | 84 |
| Vesta | Ns. 2592 | 11712 | 31.4 | 56.5 | 15.7 | 14.2 | 1.78 | 70.2 | .39 | 63 | 2.0 | 879 | 911 | 882 | 871 | 911 | 886 | 147 | 88 | 86 |
| H-44 x B5/ | II-29-52 | 11890 | 35.6 | 56.0 | 16.0 | 14.5 | 1.71 | 68.9 | .42 | 63 | 2.0 | 798 | 908 | 905 | 891 | 908 | 876 | 148 | 84 | 84 |
| Merit | 1348 | 11870 | 33.7 | 57.2 | 15.3 | 14.2 | 1.74 | 70.5 | .50 | 63 | 2.0 | 735 | 890 | 908 | 896 | 908 | 857 | 148 | 88 | 86 |
| Premier | Ns. 2772 | 11940 | 38.1 | 59.4 | 15.9 | 15.0 | 1.65 | 71.3 | .47 | 63 | 2.0 | 764 | 890 | 850 | 894 | 894 | 850 | 148 | 93 | 85 |
| Average | | | 34.5 | 57.2 | 15.7 | 14.6 | 1.73 | 69.9 | .43 | 63 | 2.0 | 828 | 951 | 950 | 954 | 969 | 921 | 148 | 88 | 84 |
| Range | | | 12.6 | 4.7 | 1.5 | 1.2 | 0.33 | 3.9 | .15 | 2 | --- | 196 | 166 | 182 | 170 | 162 | 161 | 4 | 9 | 8 |

Standard error (Variety x Method interaction) for a single determination = 33.8 cc.

1/ Merit x Thatcher.
2/ Ceres-Doble Cross x Ceres-Hopo-Florence.
3/ Mercury x Comet-N.No. 1018.
4/ H-44 x Thatcher.
5/ H-44 x Thatcher.

Table 10. - Yield, milling, baking, and chemical results obtained on 23 hard red spring wheats grown in plot experiments at Dickinson, N. Dak., in 1941

| Variety | Nursery number | C.I. number | Acro yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|-------------------|----------------|-------------|------------------|--------------------|-----------------|--------------|------------------|--------------|------------|-------------------------|--------------------|----------------------------------|------------|------------|------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | | | |
| Marquis | --- | 3641 | 4.1 | 58.5 | 16.1 | 15.2 | 2.10 | 66.7 | .62 | 63 | 2.0 | 873 | 959 | 968 | 1050 | 963 | 84 | 80 |
| Pilot | 1098-13 | 11945 | 7.4 | 58.6 | 16.8 | 16.1 | 2.15 | 67.5 | .64 | 63 | 1.5 | 798 | 934 | 1003 | 1018 | 938 | 90 | 86 |
| Ceres | --- | 6900 | 6.3 | 59.2 | 16.3 | 15.7 | 1.95 | 69.4 | .53 | 63 | 2.0 | 836 | 914 | 922 | 997 | 917 | 90 | 90 |
| Marquis | 1597 | 12053 | 6.4 | 57.5 | 16.5 | 15.9 | 1.84 | 68.6 | .61 | 65 | 2.0 | 836 | 914 | 914 | 973 | 910 | 91 | 86 |
| Ransom R.I. 716.6 | --- | 11947 | 5.7 | 57.3 | 16.9 | 15.5 | 2.10 | 66.4 | .55 | 61 | 1.5 | 838 | 923 | 917 | 939 | 904 | 83 | 83 |
| Thatcher | --- | 10003 | 7.6 | 55.9 | 16.5 | 15.7 | 1.97 | 67.1 | .52 | 65 | 2.0 | 826 | 937 | 931 | 920 | 937 | 85 | 85 |
| Moritz-3 | 1348-3 | 12036 | 8.6 | 57.3 | 16.2 | 15.6 | 1.96 | 70.2 | .62 | 65 | 2.0 | 806 | 905 | 905 | 971 | 971 | 85 | 86 |
| Rival | Ms. 2634 | 11708 | 9.7 | 59.3 | 15.8 | 14.7 | 1.83 | 71.9 | .61 | 65 | 2.0 | 798 | 902 | 896 | 954 | 888 | 86 | 83 |
| Regent R.I. 975.6 | --- | 12070 | 6.3 | 57.6 | 16.9 | 16.1 | 2.00 | 67.9 | .55 | 63 | 1.5 | 758 | 855 | 865 | 960 | 885 | 85 | 88 |
| Merit | 1348 | 11870 | 8.7 | 58.7 | 16.1 | 15.1 | 1.88 | 70.3 | .62 | 65 | 2.0 | 772 | 885 | 911 | 965 | 965 | 86 | 85 |
| Carleeds | --- | 11801 | 5.2 | 55.1 | 16.8 | 15.6 | 1.99 | 68.8 | .51 | 61 | 1.5 | 792 | 868 | 934 | 936 | 883 | 89 | 90 |
| Vesta | Ms. 2592 | 11712 | 8.3 | 59.3 | 16.1 | 14.8 | 1.91 | 70.7 | .52 | 63 | 2.0 | 801 | 876 | 917 | 917 | 978 | 89 | 90 |
| Pilot-B | 1098-B | 11428 | 5.9 | 59.0 | 17.1 | 15.9 | 2.00 | 67.0 | .67 | 63 | 1.5 | 773 | 882 | 899 | 936 | 874 | 90 | 86 |
| HxH-E | 1268 | 11798 | 9.1 | 57.7 | 15.6 | 14.9 | 1.97 | 69.4 | .53 | 63 | 2.0 | 823 | 885 | 893 | 888 | 872 | 85 | 85 |
| R-Hx-C | 11214/1520 | 12050 | 9.2 | 60.3 | 16.0 | 14.7 | 1.98 | 70.0 | .50 | 63 | 1.5 | 772 | 871 | 890 | 928 | 885 | 88 | 85 |
| Ceres x Pilot | 1552 | 12077 | 9.4 | 59.3 | 15.7 | 14.6 | 1.98 | 69.3 | .63 | 63 | 1.5 | 685 | 817 | 905 | 891 | 905 | 89 | 85 |
| R-RxH-44 | 1520 | 12051 | 7.2 | 58.9 | 16.6 | 15.7 | 2.00 | 70.4 | .72 | 63 | 2.0 | 703 | 818 | 838 | 891 | 891 | 78 | 80 |
| C-NxH-C9 | 1596 | 12052 | 4.7 | 53.5 | 14.7 | 14.0 | 1.88 | 70.2 | .65 | 65 | 2.0 | 666 | 821 | 795 | 844 | 782 | 73 | 84 |
| Premier | Ms. 2772 | 11940 | 4.8 | 60.6 | 15.6 | 14.3 | 1.87 | 69.9 | .53 | 63 | 2.0 | 660 | 784 | 778 | 832 | 764 | 88 | 85 |
| CxH-R7 | 1534 | 12039 | 9.6 | 59.5 | 16.2 | 15.2 | 1.84 | 68.7 | .61 | 63 | 2.0 | 654 | 764 | 806 | 824 | 762 | 80 | 76 |
| Mac-10188 | Ms. 2822 | 12071 | 5.2 | 58.6 | 16.0 | 14.9 | 1.77 | 70.7 | .51 | 63 | 1.5 | 651 | 781 | 806 | 786 | 757 | 84 | 85 |
| Ma-H-44-C9 | Ms. 2946 | 12253 | 7.9 | 60.4 | 15.6 | 14.0 | 1.81 | 70.9 | .54 | 63 | 2.0 | 608 | 775 | 803 | 804 | 747 | 84 | 81 |
| GDxCHFL | Ms. 2029 | 12003 | 7.3 | 60.3 | 14.4 | 13.4 | 1.84 | 70.4 | .52 | 63 | 2.0 | 587 | 772 | 752 | 775 | 722 | 86 | 83 |
| Average | | | 7.2 | 58.6 | 16.1 | 15.1 | 1.94 | 69.2 | .58 | 63 | 1.8 | 753 | 863 | 885 | 913 | 853 | 86 | 85 |
| Range | | | 5.0 | 5.5 | 2.7 | 2.7 | 0.38 | 5.5 | .22 | 4 | 0.5 | 267 | 195 | 251 | 275 | 241 | 18 | 14 |

Standard error (Variety x Method interaction) for a single determination = 25.0 cc.

1/ Moritz x Thatcher.
 2/ Hope x Hard Federation.
 3/ Reliance-Hope x Comet-N. No. 1121.
 4/ Reliance-Reward x H-44-Ceres.
 5/ Comet-N. No. 1110 x H-44-Ceres.
 6/ Ceres x Hope-Ridit.

7/ Ceres x Hope-Ridit.
 8/ Mercury² x Comet-N. No. 1018.
 9/ Mercury² x H-44-Ceres.
 10/ Ceres-Doublo Cross x Ceres-Hope-Florence.

Table 11. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in plot experiments at Brookings, S. Dak., in 1941

| Variety | Nursery number | C.I. number | Acro yield (Bu.) | Test weight (Lbs.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour Yield (Pct.) | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|--------------------|----------------|-------------|------------------|--------------------|------------------------|-------|------------------|--------------------|-----|-------------------------|--------------------|----------------------------------|-------|-------|-------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | Yield | Ash | | | No. 1 | No. 2 | No. 3 | No. 6 | | | |
| M x R ² | 1597 | 12053 | 13.9 | 51.1 | 15.4 | 14.7 | 2.00 | 68.8 | .63 | 66 | 2.0 | 767 | 897 | 923 | 945 | 883 | 88 | 84 |
| Regent | R.L. 975.1 | 11887 | 20.4 | 54.7 | 15.0 | 14.2 | 2.00 | 71.6 | .64 | 63 | 2.0 | 726 | 806 | 914 | 957 | 851 | 84 | 84 |
| Renown | R.L. 716.6 | 11947 | 17.3 | 57.7 | 14.9 | 14.2 | 2.11 | 72.1 | .58 | 63 | 2.0 | 668 | 807 | 908 | 966 | 833 | 84 | 83 |
| Vesta | Ns. 2592 | 11712 | 19.7 | 57.8 | 14.0 | 13.3 | 2.00 | 72.7 | .59 | 66 | 2.5 | 694 | 850 | 876 | 930 | 833 | 90 | 86 |
| Rival | Ns. 2634 | 11708 | 21.0 | 55.8 | 14.9 | 14.0 | 1.74 | 71.5 | .57 | 65 | 3.0 | 683 | 813 | 883 | 925 | 827 | 86 | 86 |
| Pilot | 1098-13 | 11945 | 20.9 | 57.3 | 14.1 | 13.0 | 1.96 | 71.1 | .59 | 63 | 2.0 | 735 | 809 | 862 | 902 | 827 | 88 | 90 |
| Thatcher | ----- | 10003 | 15.9 | 56.5 | 14.1 | 13.1 | 1.94 | 71.6 | .58 | 63 | 2.0 | 688 | 804 | 879 | 923 | 824 | 86 | 86 |
| R-HxR ³ | S.D. 1465 | 12033 | 17.4 | 60.6 | 14.5 | 13.2 | 1.91 | 71.0 | .56 | 63 | 2.0 | 668 | 847 | 856 | 908 | 820 | 84 | 81 |
| Merit-3 | 1348-3 | 12036 | 18.3 | 54.8 | 14.3 | 13.3 | 2.00 | 70.2 | .59 | 68 | 2.5 | 677 | 809 | 835 | 908 | 815 | 85 | 85 |
| Merit | 1348 | 11870 | 19.2 | 56.2 | 14.0 | 12.7 | 1.93 | 71.0 | .58 | 71 | 2.5 | 682 | 807 | 879 | 879 | 812 | 88 | 86 |
| Opex Ceres | S.D. 1463 | 11897 | 16.6 | 56.6 | 13.9 | 13.3 | 1.97 | 70.9 | .59 | 63 | 2.0 | 602 | 835 | 803 | 850 | 793 | 86 | 90 |
| R-HxR ³ | S.D. 1464 | 12009 | 22.2 | 61.6 | 14.7 | 13.9 | 1.90 | 71.3 | .61 | 63 | 2.0 | 666 | 801 | 833 | 856 | 790 | 85 | 84 |
| H-4xT ⁴ | II-23-61 | 11791 | 21.2 | 59.3 | 14.2 | 13.2 | 2.00 | 72.6 | .60 | 63 | 2.0 | 632 | 798 | 772 | 823 | 756 | 86 | 85 |
| H-4xT ⁴ | II-29-52 | 11890 | 22.7 | 57.3 | 14.0 | 12.8 | 1.91 | 72.0 | .60 | 63 | 2.0 | 602 | 764 | 781 | 823 | 743 | 86 | 81 |
| Premier | Ns. 2772 | 11940 | 24.5 | 60.5 | 14.7 | 13.7 | 1.97 | 71.5 | .58 | 65 | 2.0 | 626 | 735 | 775 | 772 | 727 | 88 | 80 |
| Average | | | 19.4 | 57.2 | 14.4 | 13.5 | 1.96 | 71.3 | .59 | 65 | 2.2 | 630 | 812 | 854 | 891 | 809 | 86 | 85 |
| Range | | | 10.6 | 6.8 | 1.5 | 2.0 | 0.37 | 3.9 | .08 | 8 | 1.0 | 165 | 162 | 151 | 196 | 193 | 6 | 10 |

1/ Standard error (Variety x Method interaction) for a single determination = 24.6 cc.

2/ Merit x Thatcher.

3/ Reliance-Hope x Howard.

4/ H-44 x Thatcher.

Table 12. - Yield, milling, baking, and chemical results obtained on a few of the hard red spring wheats grown in plot experiments at Madison, Wis.; Ames, Iowa; and Eureka, S. Dak.; in 1941

| Variety | Nursery number | C.I. number | Acro yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour yield (Pct.) | | Water absorption average time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) | |
|-------------------------|----------------|-------------|------------------|--------------------|-----------------|--------------|------------------|--------------------|------------|--------------------------------------|----------------------------------|---------------|----------------|-----|-----|-----|--------------------------------|-----------------------------|-------------------------------|----|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | No. 1 (Cc) | No. 2 (Cc) | | No. 3 (Cc) | Opti-mum (Cc) | Ave-range (Cc) | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Madison, Wisconsin | | | | | | | | | | | | | | | | | | | | |
| HxL | 11-31-9 | 12251 | 31.1 | 59.4 | 15.5 | 14.7 | 2.00 | 73.9 | .53 | 67 | 2.5 | 729 | 344 | 379 | 942 | 942 | 349 | 149 | 84 | 93 |
| 2/ | Wis. 233 | 12265 | 30.5 | 58.3 | 14.1 | 13.2 | 1.99 | 72.6 | .49 | 63 | 2.0 | 663 | 332 | 329 | 920 | 920 | 313 | 147 | 79 | 90 |
| 3/ | ----- | ----- | 29.2 | 60.1 | 14.4 | 13.6 | 1.91 | 71.4 | .46 | 63 | 2.0 | 663 | 315 | 790 | 823 | 823 | 776 | 146 | 88 | 91 |
| Thatcher | ----- | 10003 | 16.4 | 57.2 | 13.5 | 13.0 | 2.00 | 72.5 | .56 | 63 | 2.0 | 535 | 706 | 821 | 830 | 830 | 738 | 149 | 75 | 81 |
| Merit | 1348 | 11870 | 29.5 | 58.2 | 13.6 | 12.7 | 1.89 | 72.9 | .53 | 68 | 2.5 | 556 | 724 | 789 | 792 | 792 | 715 | 154 | 81 | 84 |
| Average | | | 27.3 | 58.6 | 14.2 | 13.4 | 1.96 | 72.7 | .51 | 65 | 2.2 | 640 | 784 | 823 | 865 | 865 | 778 | 149 | 81 | 88 |
| Range | | | 14.7 | 2.9 | 2.0 | 2.0 | 0.11 | 2.5 | .10 | 5 | 0.5 | 173 | 138 | 90 | 150 | 150 | 134 | 8 | 13 | 12 |
| Ames, Iowa | | | | | | | | | | | | | | | | | | | | |
| H-44xT4 | 11-28-61 | 11791 | ---- | 54.4 | 17.4 | 16.1 | 2.25 | 68.9 | .51 | 63 | 2.0 | 758 | 859 | 923 | 957 | 957 | 874 | 147 | 81 | 83 |
| H-44xT4 | 11-29-52 | 11090 | ---- | 52.0 | 17.0 | 15.8 | 2.19 | 69.4 | .51 | 63 | 2.0 | 703 | 812 | 923 | 942 | 942 | 845 | 146 | 71 | 81 |
| Merit | 1348 | 11870 | ---- | 53.2 | 16.0 | 15.1 | 2.13 | 68.8 | .54 | 66 | 2.0 | 611 | 737 | 856 | 960 | 960 | 791 | 151 | 69 | 75 |
| Average | | | ---- | 53.2 | 16.8 | 15.7 | 2.19 | 69.0 | .52 | 64 | 2.0 | 691 | 803 | 900 | 953 | 953 | 837 | 148 | 74 | 80 |
| Range | | | ---- | 2.4 | 1.4 | 1.0 | 0.12 | 0.6 | .03 | 3 | --- | 147 | 122 | 67 | 18 | 18 | 83 | 5 | 12 | 8 |
| Eureka, South Dakota | | | | | | | | | | | | | | | | | | | | |
| Vesta | Ms. 2592 | 11712 | 36.9 | 50.4 | 15.2 | 14.2 | 1.82 | 73.5 | .50 | 63 | 2.5 | 672 | 829 | 914 | 965 | 965 | 845 | 151 | 83 | 84 |
| Regent | R.L. 975.1 | 11069 | 40.7 | 57.6 | 15.5 | 14.7 | 1.86 | 71.4 | .53 | 65 | 2.0 | 663 | 810 | 902 | 935 | 935 | 842 | 150 | 89 | 85 |
| Hope x Geros | S.D. 1453 | 11897 | 37.2 | 58.3 | 14.6 | 13.7 | 1.84 | 72.0 | .55 | 63 | 2.0 | 671 | 821 | 882 | 928 | 928 | 826 | 147 | 86 | 88 |
| M ² -C-10185 | Ms. 2022 | 12071 | 37.5 | 57.8 | 15.0 | 14.1 | 1.63 | 72.9 | .45 | 65 | 2.0 | 635 | 769 | 902 | 939 | 939 | 811 | 146 | 89 | 89 |
| Average | | | 38.1 | 58.0 | 15.1 | 14.2 | 1.79 | 72.5 | .51 | 64 | 2.1 | 660 | 809 | 900 | 954 | 954 | 831 | 149 | 87 | 87 |
| Range | | | 3.8 | 0.8 | 0.9 | 1.0 | 0.23 | 2.1 | .10 | 2 | 0.5 | 37 | 60 | 32 | 57 | 57 | 34 | 5 | 6 | 5 |

1/ Hope x Thatcher.

2/ H157a-4-12-8.

3/ H44-2-11-3-4.

4/ H-14 x Thatcher.

5/ Mercury x Comet-N. No. 1018.

Table 13. - Yield, milling, baking, and chemical results obtained on 8 hard red spring wheats grown in plot experiments at Havre, Mont., in 1941

| Variety | Nursery number | C.I. number | Acre yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption average (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|----------|----------------|-------------|------------------|--------------------|-----------------|-------|------------------|-------|-----|---------------------------------|--------------------|----------------------------------|------|------|------|----------|-----------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | Yield | Ash | | | No.1 | No.2 | No.3 | No.6 | Opti-mun | Ave-range | | | |
| Renown | R.L.716.6 | 11947 | 21.9 | 58.9 | 16.7 | 15.6 | 1.61 | 70.0 | .48 | 63 | 2.0 | 761 | 876 | 865 | 925 | 925 | 857 | 148 | 94 | 83 |
| Marquis | ----- | 3641 | 21.7 | 60.1 | 16.4 | 15.1 | 1.53 | 70.0 | .48 | 65 | 2.0 | 704 | 813 | 844 | 865 | 865 | 803 | 152 | 90 | 86 |
| Merit | 1343 | 11370 | 25.8 | 57.3 | 16.3 | 15.0 | 1.54 | 70.4 | .54 | 66 | 2.0 | 666 | 809 | 850 | 882 | 882 | 802 | 153 | 93 | 85 |
| Pilot | 1090-B | 11423 | 28.6 | 58.1 | 17.2 | 16.0 | 1.59 | 68.1 | .54 | 63 | 2.0 | 712 | 835 | 809 | 832 | 835 | 797 | 149 | 88 | 85 |
| Ceres | ----- | 6900 | 28.4 | 59.7 | 16.7 | 15.5 | 1.55 | 70.2 | .50 | 66 | 2.0 | 700 | 818 | 815 | 844 | 844 | 791 | 152 | 89 | 88 |
| Thatcher | ----- | 10003 | 29.2 | 57.9 | 16.5 | 15.6 | 1.47 | 70.0 | .47 | 63 | 2.0 | 700 | 809 | 778 | 833 | 833 | 780 | 149 | 90 | 85 |
| Rival | Ns.2634 | 11708 | 21.9 | 58.2 | 15.9 | 14.7 | 1.52 | 71.6 | .52 | 65 | 2.0 | 648 | 789 | 815 | 829 | 829 | 770 | 151 | 93 | 85 |
| Premier | Ns.2772 | 11940 | 22.5 | 59.4 | 16.2 | 15.1 | 1.53 | 70.6 | .50 | 66 | 2.0 | 632 | 761 | 769 | 809 | 809 | 743 | 154 | 93 | 83 |
| Average | | | 24.3 | 58.8 | 16.5 | 15.3 | 1.54 | 70.1 | .50 | 65 | 2.0 | 690 | 814 | 818 | 852 | 853 | 794 | 151 | 91 | 85 |
| Range | | | 7.5 | 2.3 | 1.3 | 1.3 | 0.14 | 3.5 | .07 | 3 | --- | 129 | 115 | 96 | 116 | 116 | 114 | 6 | 6 | 5 |

1/ Standard error (Variety x Method interaction) for a single determination = 17.9 cc.

Table 14. - Yield, milling, baking, and chemical results obtained on 13 hard red spring wheats grown in plot experiments at Moccasin, Mont., in 1941

| Variety | Nursery number | C.I. number | Acre yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption average (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|------------|----------------|-------------|------------------|--------------------|-----------------|-------|------------------|-------|-----|---------------------------------|--------------------|----------------------------------|------|------|------|----------|-----------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | Yield | Ash | | | No.1 | No.2 | No.3 | No.6 | Opti-mun | Ave-range | | | |
| Pilot | 1090-13 | 11945 | 17.6 | 55.4 | 16.5 | 15.4 | 1.91 | 66.3 | .43 | 65 | 2.5 | 755 | 863 | 931 | 91.7 | 931 | 868 | 150 | 83 | 84 |
| Thatcher | ----- | 10003 | 18.0 | 56.8 | 16.3 | 15.5 | 1.76 | 68.4 | .44 | 63 | 2.0 | 710 | 844 | 910 | 888 | 910 | 838 | 150 | 81 | 89 |
| Renown | R.L.716.6 | 11947 | 14.7 | 59.0 | 15.7 | 14.7 | 1.82 | 70.1 | .45 | 63 | 2.0 | 657 | 815 | 911 | 891 | 911 | 819 | 150 | 85 | 84 |
| Vesta | Ns.2592 | 11712 | 19.1 | 58.2 | 16.5 | 15.6 | 1.74 | 70.9 | .48 | 63 | 2.5 | 652 | 801 | 939 | 844 | 939 | 809 | 151 | 85 | 85 |
| H-44-Cx12 | 1464 | 11929 | 17.3 | 54.8 | 15.9 | 15.0 | 1.88 | 67.9 | .46 | 63 | 2.0 | 608 | 789 | 862 | 885 | 885 | 786 | 151 | 80 | 84 |
| Supreme | ----- | 8026 | 17.7 | 57.6 | 14.4 | 13.5 | 1.63 | 68.8 | .44 | 63 | 2.0 | 646 | 775 | 815 | 897 | 897 | 783 | 151 | 79 | 86 |
| Ceres | ----- | 6900 | 19.8 | 59.0 | 15.7 | 15.1 | 1.72 | 70.1 | .46 | 64 | 2.0 | 641 | 801 | 833 | 833 | 838 | 773 | 150 | 83 | 85 |
| Merit | 1348 | 11370 | 17.9 | 55.8 | 15.9 | 15.1 | 1.83 | 68.6 | .50 | 70 | 2.5 | 614 | 740 | 847 | 905 | 905 | 777 | 158 | 79 | 80 |
| H-44-Cx13 | II-29-52 | 11890 | 17.2 | 57.2 | 15.7 | 14.4 | 1.85 | 69.4 | .43 | 63 | 2.0 | 703 | 778 | 812 | 792 | 812 | 771 | 151 | 86 | 85 |
| Rival | Ns.2634 | 11708 | 17.0 | 56.3 | 16.1 | 15.3 | 1.84 | 69.2 | .51 | 66 | 2.5 | 623 | 718 | 844 | 896 | 896 | 770 | 154 | 83 | 85 |
| Marquis | ----- | 3641 | 17.3 | 58.0 | 15.9 | 15.0 | 1.80 | 68.8 | .47 | 63 | 2.0 | 632 | 772 | 812 | 809 | 812 | 756 | 150 | 86 | 89 |
| Comet-1110 | 1466 | 11931 | 18.5 | 59.0 | 16.2 | 15.1 | 1.78 | 70.5 | .42 | 65 | 2.5 | 641 | 767 | 827 | 778 | 827 | 753 | 151 | 85 | 83 |
| Premier | Ns.2772 | 11940 | 18.0 | 59.5 | 15.4 | 14.8 | 1.70 | 70.2 | .48 | 68 | 2.0 | 576 | 715 | 826 | 871 | 871 | 747 | 157 | 83 | 83 |
| Average | | | 17.7 | 57.4 | 15.9 | 15.0 | 1.79 | 69.2 | .46 | 65 | 2.2 | 651 | 783 | 859 | 862 | 880 | 789 | 152 | 83 | 85 |
| Range | | | 5.1 | 4.7 | 2.1 | 2.1 | 0.28 | 4.6 | .09 | 7 | 0.5 | 179 | 153 | 127 | 139 | 27 | 121 | 8 | 7 | 9 |

1/ Standard error (Variety x Method interaction) for a single determination = 34.4 cc.

2/ H-44-Ceres x Marquis.

3/ H-44 x Thatcher.

Table 15. - Yield, milling, baking, and chemical results obtained on 12 hard red spring wheats grown in plot experiments at Shoridan, Wyo., in 1941

| Variety | Nursery number | C.I. number | Acre yield (Bu.) | Test weight (lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------|----------------|-------------|------------------|--------------------|-----------------|--------------|------------------|--------------|------------|-------------------------|--------------------|----------------------------------|------------|------------|------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | | | |
| Pilot | 1098-13 | 11945 | 27.2 | 56.0 | 17.7 | 16.5 | 1.67 | 66.2 | .47 | 66 | 2.0 | 876 | 976 | 933 | 945 | 976 | 933 | 84 |
| Marquis | ----- | 3641 | 23.5 | 57.8 | 17.3 | 16.3 | 1.78 | 67.6 | .53 | 65 | 2.0 | 787 | 888 | 928 | 931 | 931 | 884 | 88 |
| Thatcher | ----- | 10003 | 28.4 | 56.7 | 18.0 | 17.2 | 1.67 | 67.6 | .50 | 65 | 2.0 | 830 | 902 | 891 | 911 | 911 | 886 | 89 |
| Ceres | ----- | 6900 | 24.4 | 58.5 | 17.1 | 15.9 | 1.73 | 68.3 | .48 | 69 | 2.5 | 758 | 871 | 885 | 920 | 920 | 889 | 83 |
| Renown | B.L. 716.6 | 11947 | 24.1 | 57.9 | 17.2 | 16.4 | 1.72 | 68.7 | .58 | 63 | 2.0 | 735 | 824 | 876 | 897 | 897 | 833 | 84 |
| CCC-Chief | Ns. 2829 | 12008 | 26.9 | 59.1 | 16.3 | 14.7 | 1.62 | 68.1 | .66 | 63 | 2.0 | 703 | 841 | 809 | 812 | 841 | 791 | 88 |
| Merit | 1343 | 11870 | 23.9 | 55.2 | 17.6 | 16.7 | 1.73 | 67.8 | .63 | 68 | 2.0 | 643 | 795 | 856 | 865 | 865 | 790 | 79 |
| Premier | Ns. 2772 | 11940 | 27.8 | 59.5 | 16.3 | 15.5 | 1.60 | 69.6 | .53 | 67 | 2.0 | 672 | 780 | 829 | 879 | 879 | 790 | 84 |
| Rival | Ns. 2634 | 11708 | 27.5 | 58.2 | 16.3 | 15.1 | 1.62 | 68.8 | .50 | 65 | 2.5 | 638 | 815 | 818 | 855 | 855 | 782 | 85 |
| Comet x Pilot | 1585 | 12073 | 28.7 | 56.4 | 16.7 | 15.3 | 1.59 | 67.1 | .43 | 65 | 2.0 | 694 | 818 | 783 | 780 | 818 | 769 | 84 |
| Comet-1121 | 1504 | 12258 | 27.2 | 57.3 | 16.4 | 14.9 | 1.60 | 66.5 | .44 | 63 | 2.0 | 663 | 812 | 780 | 767 | 812 | 756 | 85 |
| Comet-1110 | 1466 | 11931 | 26.9 | 59.5 | 16.8 | 14.8 | 1.56 | 68.9 | .46 | 63 | 2.0 | 641 | 792 | 778 | 775 | 792 | 747 | 84 |
| Average | | | 26.4 | 57.7 | 17.0 | 15.8 | 1.66 | 67.9 | .52 | 65 | 2.1 | 721 | 843 | 847 | 861 | 875 | 818 | 85 |
| Range | | | 5.2 | 4.3 | 1.7 | 2.5 | 0.22 | 3.4 | .23 | 6 | 0.5 | 238 | 196 | 155 | 178 | 184 | 186 | 10 |

1/ Standard error (Variety x Method interaction) for a single determination = 29.6 cc.
 2/ Ceres-Double Cross x Ceres-Hopo-Florence.

Table 16. - Yield, milling, baking, and chemical results on 26 wheats grown in the Uniform Regional Nursery for the eastern composite/ from eight stations, in 1941

| Variety or nursery number | C.I. number | Acro yield (Bu.) | Test weight (Lbs.) | Wheat carotenoid content (P.p.n.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour Yield (Pct.) | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------------------|-------------|------------------|--------------------|-----------------------------------|------------------------|-------|------------------|--------------------|-----|-------------------------|--------------------|----------------------------------|------|------|------|----------|-----------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat Flour | Wheat | | Yield | Ash | | | No.1 | No.2 | No.3 | No.6 | Opti-run | Ave-range | | | |
| II-31-14 | 12044 | 27.6 | 56.5 | 3.37 | 16.2 | 15.5 | 2.05 | 72.6 | .58 | 65 | 2.0 | 832 | 879 | 939 | 1070 | 1070 | 930 | 148 | 75 | 90 |
| II-31-6 | 12043 | 27.2 | 57.3 | 3.59 | 16.3 | 15.9 | 2.05 | 72.3 | .63 | 66 | 2.0 | 821 | 903 | 934 | 1053 | 1053 | 929 | 143 | 81 | 90 |
| R.L.1333 | 12012 | 24.2 | 57.5 | 4.04 | 15.5 | 15.0 | 2.14 | 71.0 | .55 | 63 | 2.0 | 801 | 873 | 982 | 1027 | 1027 | 921 | 147 | 88 | 93 |
| II-31-2 | 12199 | 30.4 | 58.8 | 3.37 | 15.3 | 15.0 | 1.98 | 72.5 | .53 | 66 | 2.0 | 798 | 888 | 934 | 1015 | 1015 | 909 | 149 | 85 | 94 |
| Regent | 12070 | 24.2 | 58.0 | 3.71 | 15.6 | 15.4 | 2.16 | 71.7 | .55 | 65 | 2.0 | 758 | 818 | 982 | 1047 | 1047 | 901 | 148 | 80 | 88 |
| II-29-57 | 12040 | 25.2 | 58.6 | 3.14 | 15.1 | 14.0 | 1.96 | 69.3 | .48 | 65 | 2.0 | 778 | 891 | 896 | 943 | 943 | 873 | 149 | 85 | 93 |
| S.D.1463.26 | 12058 | 24.6 | 58.7 | 3.37 | 14.9 | 14.0 | 2.03 | 72.4 | .62 | 63 | 2.0 | 721 | 864 | 896 | 1009 | 1009 | 873 | 147 | 83 | 91 |
| II-29-72 | 12041 | 27.6 | 57.6 | 3.59 | 15.5 | 14.7 | 2.06 | 71.6 | .55 | 65 | 2.0 | 721 | 832 | 899 | 988 | 988 | 850 | 149 | 76 | 88 |
| Thatcher | 10003 | 19.3 | 57.0 | 4.04 | 14.4 | 13.7 | 2.02 | 71.7 | .56 | 63 | 2.0 | 758 | 868 | 879 | 930 | 930 | 859 | 147 | 75 | 89 |
| Ns. 2029 | 12008 | 32.0 | 61.0 | 3.14 | 15.7 | 14.7 | 2.02 | 72.5 | .55 | 65 | 2.0 | 749 | 856 | 862 | 925 | 925 | 848 | 149 | 90 | 93 |
| Marit-3 | 12036 | 23.0 | 55.0 | 3.71 | 15.4 | 14.4 | 2.07 | 71.5 | .57 | 69 | 2.5 | 666 | 798 | 920 | 962 | 962 | 837 | 151 | 71 | 83 |
| 1595 | 12194 | 27.1 | 58.7 | 4.16 | 15.2 | 14.2 | 2.10 | 70.8 | .59 | 63 | 2.0 | 694 | 841 | 879 | 919 | 919 | 833 | 147 | 83 | 90 |
| Marquis | 3641 | 13.1 | 53.2 | 4.72 | 14.3 | 13.5 | 2.20 | 65.1 | .59 | 63 | 2.0 | 710 | 823 | 876 | 917 | 917 | 832 | 147 | 75 | 88 |
| 1597 | 12053 | 26.2 | 57.0 | 3.71 | 15.5 | 14.9 | 1.85 | 70.6 | .64 | 66 | 2.0 | 638 | 809 | 891 | 963 | 963 | 825 | 149 | 85 | 88 |
| 1593 | 12193 | 30.1 | 59.2 | 3.37 | 14.3 | 12.9 | 1.96 | 73.8 | .51 | 63 | 2.0 | 729 | 806 | 853 | 908 | 908 | 824 | 147 | 81 | 89 |
| 1529 | 12192 | 25.6 | 57.7 | 4.50 | 14.6 | 13.2 | 1.94 | 71.6 | .56 | 63 | 2.0 | 704 | 812 | 859 | 914 | 914 | 822 | 147 | 79 | 88 |
| S.D.1464.18 | 12059 | 24.6 | 62.0 | 3.37 | 15.2 | 13.7 | 1.98 | 70.3 | .61 | 63 | 2.0 | 755 | 841 | 807 | 882 | 882 | 821 | 147 | 79 | 88 |
| 1520 | 12050 | 27.3 | 58.4 | 4.16 | 15.1 | 14.5 | 2.03 | 72.5 | .55 | 63 | 2.0 | 700 | 841 | 813 | 920 | 920 | 820 | 147 | 83 | 90 |
| 1523 | 12047 | 27.0 | 59.1 | 3.48 | 15.0 | 14.1 | 2.03 | 72.8 | .76 | 63 | 2.0 | 694 | 737 | 868 | 911 | 911 | 815 | 149 | 88 | 93 |
| Ns. 2849 | 12198 | 32.5 | 61.1 | 2.35 | 15.5 | 14.3 | 2.02 | 72.5 | .60 | 63 | 2.0 | 735 | 870 | 739 | 853 | 870 | 812 | 147 | 89 | 93 |
| 1552 | 12077 | 24.6 | 56.2 | 4.38 | 15.3 | 14.1 | 2.11 | 70.5 | .62 | 63 | 1.5 | 629 | 755 | 856 | 965 | 965 | 801 | 148 | 75 | 83 |
| Ns. 2918 | 12197 | 30.4 | 58.2 | 2.92 | 14.6 | 13.8 | 1.89 | 73.7 | .59 | 66 | 2.0 | 674 | 812 | 821 | 893 | 893 | 800 | 150 | 75 | 88 |
| 1596 | 12052 | 27.3 | 58.9 | 3.59 | 14.2 | 13.1 | 1.91 | 72.4 | .69 | 63 | 2.0 | 666 | 789 | 827 | 914 | 914 | 799 | 149 | 70 | 85 |
| Ns. 2904 | 12196 | 28.6 | 58.2 | 3.03 | 14.9 | 13.6 | 1.96 | 72.6 | .57 | 65 | 2.0 | 729 | 798 | 778 | 856 | 856 | 790 | 150 | 84 | 89 |
| Ns. 2822 | 12071 | 26.2 | 57.3 | 3.14 | 15.5 | 14.6 | 1.93 | 73.7 | .56 | 63 | 2.0 | 623 | 735 | 832 | 911 | 911 | 775 | 149 | 78 | 86 |
| 1563 | 12195 | 32.2 | 57.7 | 3.26 | 14.0 | 13.1 | 1.95 | 74.6 | .57 | 63 | 1.5 | 599 | 715 | 789 | 859 | 859 | 741 | 150 | 81 | 76 |
| Average | | 26.5 | 58.1 | 3.59 | 15.1 | 14.2 | 2.02 | 71.8 | .58 | 64 | 2.0 | 719 | 827 | 872 | 945 | 945 | 841 | 148 | 81 | 89 |
| Range | | 19.4 | 6.0 | 2.37 | 2.3 | 3.0 | 0.35 | 9.5 | .28 | 6 | 1.0 | 233 | 193 | 204 | 217 | 214 | 189 | 7 | 20 | 13 |

1/ One-half pound from each of the St. Paul, Waseca, Morris, Crookston, Langdon, Fargo, Brookings, and Madison stations.
 2/ Standard error (Variety x Method interaction) for a single determination = 34.1 cc.

Table 17. - Yield, milling, baking, and chemical results on 26 wheats grown in the Uniform Regional Nursery for the western composite/
from 5 stations, in 1941

| Variety or nursery number | C.I. number | Acre yield (Bu.) | Test weight (Lbs.) | Wheat carotenoid content (P.p.m.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------------------|-------------|------------------|--------------------|-----------------------------------|-----------------|--------|------------------|--------|--------|-------------------------|--------------------|--------------------------|------|------|------|--------------------------------|-----------------------------|-------------------------------|
| | | | | | Wheat | Flour | | Yield | Ash | | | No.1 | No.2 | No.3 | No.6 | | | |
| | | | | | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | | | (Cc) | (Cc) | (Cc) | (Cc) | | | |
| R.I.1333 | 12012 | 24.8 | 58.2 | 2.69 | 16.3 | 15.7 | 1.81 | 70.0 | .57 | 63 | 2.0 | 838 | 897 | 1000 | 1018 | 938 | 146 | 89 |
| II-31-2 | 12199 | 28.6 | 58.0 | 3.03 | 16.4 | 15.1 | 1.71 | 70.1 | .42 | 63 | 2.0 | 821 | 888 | 965 | 1032 | 927 | 146 | 89 |
| II-29-72 | 12041 | 25.7 | 57.4 | 2.80 | 16.4 | 15.2 | 1.77 | 70.7 | .59 | 63 | 2.0 | 764 | 847 | 982 | 1038 | 908 | 147 | 85 |
| 1597 | 12053 | 23.4 | 58.0 | 1.90 | 16.0 | 15.4 | 1.72 | 69.6 | .54 | 67 | 2.0 | 764 | 876 | 951 | 1021 | 903 | 149 | 93 |
| Thatcher | 10003 | 27.6 | 58.1 | 3.14 | 16.7 | 15.9 | 1.69 | 71.6 | .56 | 63 | 2.0 | 801 | 871 | 943 | 994 | 902 | 147 | 81 |
| II-29-57 | 12040 | 24.8 | 59.0 | 2.69 | 16.1 | 15.1 | 1.63 | 70.0 | .46 | 63 | 2.0 | 764 | 894 | 890 | 974 | 881 | 147 | 90 |
| 1595 | 12194 | 23.0 | 59.0 | 3.37 | 16.4 | 15.7 | 1.82 | 69.8 | .51 | 63 | 2.0 | 752 | 885 | 925 | 959 | 880 | 147 | 85 |
| II-31-6 | 12043 | 23.6 | 57.8 | 2.69 | 17.1 | 16.3 | 1.80 | 69.9 | .61 | 63 | 2.0 | 778 | 847 | 902 | 971 | 875 | 147 | 86 |
| Regent | 12070 | 22.9 | 58.3 | 2.58 | 1.69 | 16.3 | 1.78 | 69.2 | .48 | 64 | 2.0 | 758 | 871 | 938 | 928 | 938 | 147 | 83 |
| II-31-14 | 12044 | 27.0 | 57.5 | 2.80 | 16.3 | 15.7 | 1.72 | 70.5 | .48 | 63 | 2.0 | 726 | 835 | 914 | 960 | 859 | 148 | 84 |
| Ms. 2829 | 12008 | 26.5 | 60.3 | 2.58 | 16.0 | 15.2 | 1.73 | 71.0 | .42 | 63 | 2.0 | 752 | 853 | 900 | 925 | 858 | 147 | 93 |
| Merit-3 | 12036 | 26.4 | 57.2 | 2.92 | 16.4 | 15.6 | 1.72 | 71.0 | .65 | 67 | 2.0 | 719 | 859 | 885 | 956 | 855 | 151 | 80 |
| 1523 | 12047 | 24.5 | 59.8 | 2.92 | 15.7 | 14.7 | 1.79 | 70.7 | .51 | 63 | 2.0 | 729 | 823 | 894 | 951 | 849 | 147 | 91 |
| S.D.1463.26 | 12058 | 23.4 | 59.6 | 2.80 | 16.0 | 15.2 | 1.73 | 69.5 | .48 | 65 | 2.0 | 685 | 850 | 902 | 948 | 846 | 150 | 85 |
| 1593 | 12193 | 27.3 | 59.2 | 2.80 | 15.4 | 14.9 | 1.61 | 71.0 | .53 | 63 | 2.0 | 706 | 832 | 910 | 936 | 846 | 148 | 84 |
| Marquis | 3641 | 19.5 | 57.8 | 3.26 | 15.7 | 15.0 | 1.88 | 69.4 | .52 | 63 | 2.0 | 724 | 821 | 917 | 919 | 845 | 148 | 85 |
| 1529 | 12192 | 25.1 | 58.6 | 3.14 | 15.5 | 14.8 | 1.58 | 70.2 | .42 | 63 | 2.0 | 688 | 832 | 908 | 943 | 843 | 147 | 84 |
| Ms. 2849 | 12198 | 25.5 | 60.8 | 2.35 | 15.8 | 15.2 | 1.77 | 71.6 | .44 | 66 | 2.0 | 746 | 865 | 856 | 896 | 841 | 149 | 91 |
| 1520 | 12050 | 23.6 | 59.4 | 3.14 | 15.9 | 14.9 | 1.75 | 70.0 | .43 | 63 | 1.5 | 716 | 835 | 865 | 937 | 838 | 147 | 88 |
| 1596 | 12052 | 23.9 | 58.9 | 2.35 | 15.5 | 14.5 | 1.63 | 70.4 | .53 | 65 | 2.0 | 680 | 827 | 876 | 948 | 833 | 149 | 74 |
| S.D.1464.18 | 12059 | 22.1 | 62.0 | 3.26 | 15.7 | 14.6 | 1.68 | 70.8 | .47 | 63 | 2.0 | 729 | 838 | 835 | 912 | 829 | 146 | 81 |
| Ms. 2918 | 12197 | 25.5 | 58.6 | 2.69 | 15.2 | 14.1 | 1.70 | 71.1 | .47 | 65 | 2.0 | 674 | 826 | 812 | 894 | 802 | 150 | 80 |
| Ms. 2922 | 12071 | 26.1 | 58.3 | 2.69 | 15.9 | 14.8 | 1.58 | 70.8 | .43 | 63 | 2.0 | 679 | 803 | 838 | 879 | 839 | 149 | 85 |
| Ms. 2904 | 12196 | 24.0 | 59.2 | 2.69 | 15.4 | 14.1 | 1.65 | 71.0 | .43 | 66 | 2.0 | 700 | 801 | 826 | 868 | 799 | 150 | 88 |
| 1552 | 12077 | 24.3 | 58.0 | 3.03 | 16.7 | 15.4 | 1.79 | 68.9 | .65 | 63 | 1.5 | 620 | 740 | 803 | 879 | 879 | 149 | 73 |
| 1563 | 12195 | 25.9 | 58.1 | 2.69 | 15.0 | 14.5 | 1.68 | 70.5 | .59 | 63 | 1.5 | 608 | 712 | 749 | 812 | 812 | 151 | 78 |
| Average | | 24.8 | 58.7 | 2.81 | 16.0 | 15.2 | 1.72 | 70.4 | .51 | 64 | 1.9 | 728 | 840 | 892 | 942 | 850 | 148 | 85 |
| Range | | 9.1 | 4.8 | 1.47 | 2.1 | 2.2 | 0.30 | 2.7 | .23 | 4 | 0.5 | 230 | 185 | 197 | 226 | 218 | 5 | 20 |

1/ One pound from each of the Mandan, Moccasin, Havre, Alliance, and Akron stations.
2/ Standard error (Variety x Method interaction) for a single determination = 22.5 cc.

Table 18. -- Average yield, milling, baking, and chemical results on 26 wheats grown in the Uniform Regional Nursery for the eastern and western composites in 1941

| Variety or nursery number | C.I. number | Acro yield | Test weight | Wheat caroto- noid content | Protein content | | Wheat ash | Flour | | Water absorp- tion average | Mix- ing time | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---------------------------------|----------------|---------------|----------------|-------------------------------------|--------------------|--------|--------------|--------|--------|-------------------------------------|---------------------|-------------------------------------|------|------|------|-----------------------|---------------|--|--------------------------------------|--|
| | | | | | Wheat | Flour | | Yield | Ash | | | No.1 | No.2 | No.3 | No.6 | Opti- mum range | Avc- range | | | |
| | | | | | | | | | | | | | | | | | | | | |
| (Bu.) | (P.p.m.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Pct.) | (Min.) | (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | (Grams) | (Score) | (Score) |
| R.I. 1333 | 12012 | 24.5 | 57.9 | 3.37 | 15.9 | 15.4 | 1.98 | 70.5 | .56 | 63.0 | 2.0 | 820 | 885 | 991 | 1023 | 1023 | 930 | 147 | 89 | 92 |
| II-31-2 | 12199 | 28.5 | 58.4 | 3.20 | 15.9 | 15.1 | 1.85 | 71.3 | .48 | 64.5 | 2.0 | 810 | 888 | 950 | 1024 | 1024 | 918 | 148 | 87 | 92 |
| II-31-6 | 12043 | 25.4 | 57.6 | 3.14 | 16.7 | 16.1 | 1.93 | 71.1 | .62 | 64.5 | 2.0 | 800 | 878 | 918 | 1012 | 1012 | 902 | 148 | 84 | 93 |
| II-31-14 | 12044 | 27.3 | 57.0 | 3.09 | 16.3 | 15.6 | 1.89 | 71.6 | .53 | 64.0 | 2.0 | 779 | 857 | 927 | 1015 | 1015 | 895 | 143 | 80 | 90 |
| Regent | 12070 | 23.6 | 58.2 | 3.15 | 16.4 | 15.9 | 1.97 | 70.5 | .52 | 64.5 | 2.0 | 758 | 845 | 960 | 988 | 993 | 883 | 148 | 82 | 89 |
| II-29-72 | 12041 | 26.7 | 57.5 | 3.20 | 16.0 | 15.0 | 1.92 | 71.2 | .57 | 64.0 | 2.0 | 743 | 840 | 941 | 1013 | 1013 | 884 | 148 | 81 | 90 |
| Thatcher | 10003 | 23.5 | 57.6 | 3.59 | 15.6 | 14.8 | 1.86 | 71.7 | .56 | 63.0 | 2.0 | 780 | 870 | 911 | 962 | 962 | 881 | 147 | 78 | 90 |
| II-29-57 | 12040 | 25.0 | 58.8 | 2.92 | 15.6 | 14.6 | 1.80 | 69.7 | .47 | 64.0 | 2.0 | 771 | 893 | 893 | 961 | 961 | 880 | 148 | 87 | 93 |
| 1597 | 12053 | 24.8 | 57.5 | 2.81 | 15.8 | 15.2 | 1.79 | 70.1 | .59 | 66.5 | 2.0 | 701 | 843 | 921 | 992 | 992 | 884 | 149 | 89 | 91 |
| S.D. 1463-26 | 12058 | 24.0 | 59.2 | 3.09 | 15.5 | 14.6 | 1.88 | 71.0 | .55 | 64.0 | 2.0 | 703 | 857 | 899 | 979 | 979 | 860 | 149 | 84 | 88 |
| 1595 | 12194 | 25.1 | 50.9 | 3.77 | 15.8 | 15.0 | 1.96 | 70.3 | .55 | 63.0 | 2.0 | 723 | 863 | 902 | 939 | 939 | 857 | 147 | 84 | 92 |
| Ms. 2829 | 12008 | 29.3 | 60.7 | 2.86 | 15.9 | 15.0 | 1.88 | 71.8 | .49 | 64.0 | 2.0 | 751 | 854 | 881 | 925 | 925 | 853 | 148 | 92 | 94 |
| Merit-3 | 12036 | 24.7 | 56.1 | 3.32 | 15.9 | 15.0 | 1.90 | 71.3 | .61 | 68.0 | 2.3 | 693 | 829 | 903 | 959 | 959 | 846 | 153 | 76 | 86 |
| Marquis | 3641 | 16.3 | 55.5 | 3.99 | 15.0 | 14.3 | 2.04 | 67.3 | .56 | 63.0 | 2.0 | 717 | 822 | 897 | 918 | 918 | 839 | 146 | 80 | 90 |
| 1593 | 12193 | 28.7 | 59.2 | 3.09 | 14.8 | 13.9 | 1.79 | 72.4 | .52 | 63.0 | 2.0 | 718 | 819 | 882 | 922 | 922 | 835 | 148 | 83 | 89 |
| 1529 | 12192 | 25.4 | 58.2 | 3.02 | 15.1 | 14.0 | 1.76 | 70.9 | .49 | 63.0 | 2.0 | 696 | 822 | 884 | 929 | 929 | 833 | 147 | 82 | 88 |
| 1523 | 12047 | 25.8 | 59.5 | 3.20 | 15.4 | 14.4 | 1.91 | 71.8 | .64 | 63.0 | 2.0 | 712 | 805 | 881 | 931 | 931 | 832 | 148 | 90 | 93 |
| 1520 | 12050 | 25.5 | 58.9 | 3.65 | 15.5 | 14.7 | 1.89 | 71.3 | .49 | 63.0 | 1.8 | 708 | 838 | 842 | 929 | 929 | 829 | 147 | 86 | 90 |
| Ms. 2848 | 12198 | 29.0 | 61.0 | 2.35 | 15.7 | 15.0 | 1.90 | 72.1 | .52 | 64.5 | 2.0 | 741 | 868 | 823 | 875 | 883 | 827 | 148 | 90 | 92 |
| S.D. 1463-10 | 12059 | 23.4 | 62.0 | 3.32 | 15.5 | 14.2 | 1.83 | 70.6 | .54 | 63.0 | 2.0 | 742 | 840 | 821 | 897 | 897 | 825 | 147 | 80 | 86 |
| 1596 | 12052 | 25.6 | 58.9 | 2.97 | 14.9 | 13.8 | 1.77 | 71.4 | .61 | 64.0 | 2.0 | 673 | 808 | 852 | 931 | 931 | 816 | 149 | 72 | 88 |
| Ms. 2910 | 12197 | 28.0 | 58.4 | 2.81 | 14.9 | 14.0 | 1.80 | 72.4 | .53 | 65.5 | 2.0 | 674 | 819 | 817 | 894 | 894 | 801 | 150 | 73 | 88 |
| Ms. 2904 | 12196 | 26.3 | 59.2 | 2.86 | 15.2 | 13.9 | 1.81 | 71.8 | .50 | 65.5 | 2.0 | 715 | 800 | 802 | 862 | 862 | 795 | 150 | 86 | 89 |
| Ms. 2922 | 12071 | 26.2 | 57.8 | 2.92 | 15.7 | 14.7 | 1.76 | 72.3 | .50 | 63.0 | 2.0 | 651 | 769 | 835 | 895 | 895 | 788 | 149 | 82 | 88 |
| 1552 | 12077 | 24.5 | 57.1 | 3.71 | 16.0 | 14.8 | 1.95 | 69.7 | .64 | 63.0 | 1.5 | 625 | 743 | 830 | 922 | 922 | 781 | 149 | 74 | 79 |
| 1563 | 12195 | 29.1 | 57.9 | 2.90 | 14.5 | 13.0 | 1.82 | 72.6 | .50 | 63.0 | 1.5 | 604 | 714 | 769 | 836 | 836 | 731 | 151 | 80 | 74 |
| Average | | 25.7 | 59.4 | 3.20 | 15.6 | 14.7 | 1.87 | 71.1 | .55 | 64.0 | 2.0 | 723 | 834 | 882 | 944 | 944 | 846 | 146 | 83 | 89 |
| Range | | 13.2 | 6.5 | 1.64 | 2.2 | 2.3 | 0.28 | 5.3 | .17 | 5.0 | 0.8 | 216 | 179 | 189 | 188 | 188 | 199 | 6 | 20 | 20 |

1/ Standard error (Variety x Method interaction) for a single determination = 25.0 cc.

Table 19. - Yield, milling, baking, and chemical results on 15 hard red spring wheats grown in the North Dakota Intra-State Nursery experiments, composite/ from 2 stations, 1941 crop

| Variety or cross | Ms. or N.no. | Acre yield (Bu.) | Test weight (Lbs.) | Protein content (Pct.) | | Wheat ash (Pct.) | Flour (Pct.) | | Water absorption (Pct.) | Mixing time (Min.) | Baking method | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|---|--------------|------------------|--------------------|------------------------|-------|------------------|--------------|-----|-------------------------|--------------------|---------------|-------|--------------------------------|-----------------------------|-------------------------------|
| | | | | Wheat | Flour | | Yield | Ash | | | No. 2 | No. 6 | | | |
| Merit x Thatcher | N.No. 1682 | 30.1 | 57.6 | 16.1 | 15.2 | 1.98 | 70.1 | .62 | 67 | 2.0 | 804 | 960 | 882 | 152 | 85 |
| Thatcher | --- | 27.8 | 58.0 | 15.0 | 14.1 | 1.95 | 71.9 | .58 | 66 | 2.0 | 792 | 960 | 876 | 152 | 80 |
| Ceres-Double Cross x Ceres-Hope-Florence | Ns. 2855 | 36.8 | 61.0 | 15.5 | 14.5 | 1.90 | 73.7 | .55 | 66 | 2.0 | 778 | 928 | 853 | 152 | 93 |
| Reliance-1018 x Mercury | N.No. 1639 | 29.6 | 58.4 | 15.0 | 13.7 | 2.11 | 72.3 | .57 | 68 | 2.0 | 767 | 923 | 845 | 153 | 85 |
| Comet x Pilot | N.No. 1643 | 29.2 | 58.1 | 15.0 | 14.3 | 1.91 | 70.3 | .59 | 66 | 2.0 | 737 | 936 | 837 | 153 | 83 |
| Ceres x Komar-Hussar-Mercury | N.No. 1651 | 38.4 | 59.8 | 15.1 | 13.9 | 1.86 | 72.5 | .57 | 69 | 2.0 | 740 | 931 | 836 | 155 | 78 |
| Reliance-1018 x Mercury | N.No. 1599 | 33.7 | 58.9 | 15.4 | 14.5 | 1.86 | 75.3 | .67 | 67 | 2.0 | 778 | 885 | 832 | 155 | 88 |
| Ceres-Double Cross x Ceres-Hope-Florence | Ns. 2984 | 34.8 | 60.7 | 15.9 | 14.4 | 1.97 | 70.1 | .59 | 64 | 2.0 | 786 | 862 | 824 | 150 | 88 |
| Comet-1110 x H-44-Ceres | N.No. 1673 | 30.1 | 57.8 | 15.0 | 14.4 | 1.93 | 69.6 | .73 | 63 | 2.0 | 755 | 879 | 817 | 154 | 80 |
| Ceres-Double Cross x Ceres-Hope-Florence | Ns. 2804.18 | 34.6 | 58.8 | 15.5 | 14.1 | 1.98 | 73.4 | .61 | 66 | 2.0 | 743 | 882 | 813 | 152 | 88 |
| Reliance-1018 x Mercury | N.No. 1691 | 34.9 | 57.0 | 14.9 | 13.8 | 1.95 | 74.9 | .59 | 66 | 2.0 | 770 | 835 | 803 | 152 | 85 |
| [Ceres-Double Cross x Ceres-Hope-Florence] x [Mercury x N.No. 1342] | Us. 2943 | 31.1 | 58.9 | 15.3 | 14.1 | 1.90 | 70.0 | .67 | 67 | 2.0 | 718 | 844 | 781 | 155 | 83 |
| Mercury x Hope-Marquis (1269) | Ns. 2982 | 29.9 | 59.4 | 15.1 | 14.0 | 1.88 | 74.3 | .61 | 64 | 2.0 | 729 | 827 | 778 | 153 | 85 |
| [Ceres-Double Cross x Ceres-Hope-Florence] x [Mercury x N.No. 1383] | Ns. 2979 | 31.4 | 58.7 | 15.8 | 14.9 | 1.89 | 70.6 | .68 | 68 | 2.0 | 712 | 835 | 774 | 155 | 83 |
| [Ceres-Double Cross x Ceres-Hope-Florence] x [Mercury x N.No. 1342] | Ns. 2981 | 33.3 | 59.3 | 15.4 | 14.7 | 1.84 | 72.2 | .76 | 67 | 2.0 | 683 | 815 | 752 | 155 | 80 |
| Average | | 32.4 | 58.8 | 15.3 | 14.3 | 1.92 | 72.1 | .63 | 67 | 2.0 | 753 | 887 | 820 | 153 | 84 |
| Range | | 10.6 | 4.0 | 1.2 | 1.5 | 0.27 | 5.7 | .21 | 5 | --- | 116 | 145 | 130 | 5 | 12 |

1/ One pound from each of the Fargo and Langdon stations.

Table 20. - Yield, milling, baking, and chemical results on 22 hard red spring wheats grown in the Montana Nursery experiments composited from 2 stations, 1941 crop

Intra-State

| Variety | Ms. or N.no. | Acre yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf ² | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|----------------------------------|--------------|------------------|--------------------|-----------------|--------------|------------------|--------------|------------|-------------------------|--------------------|---|------------|------------|---------------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | Opti-man range (Cc) | | | |
| Thatcher | ---- | 24.5 | 57.5 | 17.0 | 15.6 | 1.65 | 69.2 | .47 | 67 | 2.0 | 873 | 966 | 971 | 970 | 971 | 945 | 91 |
| Reeward-Hope x Comet-Pilot | 1526 | 21.8 | 59.1 | 15.9 | 14.8 | 1.60 | 68.5 | .43 | 63 | 2.0 | 775 | 891 | 882 | 920 | 920 | 867 | 93 |
| Reliance-Hope x H-44-Ceres | 1524 | 17.6 | 58.5 | 16.4 | 15.5 | 1.74 | 71.6 | .50 | 63 | 2.0 | 740 | 876 | 876 | 920 | 920 | 853 | 89 |
| Ceres selection 8-24-1 | 23.7 | 59.5 | 16.9 | 16.1 | 1.57 | 70.3 | .43 | .67 | 67 | 2.0 | 741 | 873 | 885 | 911 | 911 | 853 | 91 |
| Merit x Pilot | 1652 | 22.0 | 57.8 | 16.7 | 16.3 | 1.62 | 68.5 | .57 | 66 | 2.0 | 743 | 891 | 862 | 911 | 911 | 852 | 90 |
| H-44-Ceres-Mercury x Mercury | 1654 | 17.1 | 57.1 | 16.1 | 15.3 | 1.66 | 73.0 | .53 | 67 | 2.5 | 746 | 897 | 882 | 872 | 897 | 849 | 91 |
| Comet-1121 x Ceres-Hope-Florence | 1666 | 12.7 | 56.8 | 17.5 | 16.4 | 1.87 | 68.3 | .52 | 65 | 2.0 | 630 | 815 | 937 | 988 | 988 | 845 | 84 |
| Comet x Pilot | 1540-2 | 23.1 | 58.9 | 16.7 | 15.7 | 1.67 | 70.2 | .47 | 65 | 2.0 | 764 | 859 | 850 | 879 | 879 | 838 | 88 |
| Comet-1110 x H-44-Ceres | 1588 | 23.2 | 59.3 | 15.6 | 14.4 | 1.59 | 72.2 | .43 | 63 | 2.0 | 729 | 862 | 829 | 841 | 841 | 815 | 91 |
| Marquis | ---- | 21.6 | 59.5 | 16.2 | 15.4 | 1.69 | 69.5 | .53 | 63 | 2.0 | 668 | 835 | 853 | 871 | 871 | 807 | 80 |
| Comet-1121 x Ceres-Hope-Florence | 1592 | 20.0 | 58.3 | 16.4 | 15.3 | 1.72 | 73.2 | .52 | 63 | 2.0 | 635 | 781 | 832 | 921 | 921 | 805 | 86 |
| Ceres | ---- | 23.6 | 59.5 | 16.4 | 15.6 | 1.58 | 71.0 | .39 | 63 | 2.0 | 712 | 841 | 818 | 841 | 841 | 803 | 93 |
| Reliance-Hope x Comet-1121 | 1747 | 21.9 | 58.7 | 16.5 | 14.5 | 1.63 | 70.0 | .43 | 63 | 1.5 | 666 | 844 | 847 | 841 | 847 | 800 | 89 |
| Comet x N.No. 1110 | 1748 | 18.8 | 60.6 | 15.5 | 14.6 | 1.61 | 71.9 | .45 | 65 | 2.0 | 685 | 798 | 820 | 850 | 850 | 783 | 86 |
| Comet (H-77) | 649 | 27.3 | 60.0 | 15.4 | 13.5 | 1.49 | 71.2 | .44 | 65 | 2.0 | 701 | 818 | 801 | 801 | 818 | 780 | 91 |
| Comet-1018 x Mercury | 1653 | 16.4 | 55.9 | 15.7 | 15.3 | 1.63 | 70.1 | .49 | 68 | 2.0 | 599 | 778 | 833 | 856 | 856 | 763 | 86 |
| Comet-1018 x Mercury | 1591 | 18.7 | 56.3 | 15.5 | 14.7 | 1.57 | 71.0 | .48 | 67 | 2.5 | 652 | 778 | 812 | 818 | 818 | 765 | 89 |
| Comet x N.No. 1121 | 1749 | 23.1 | 58.6 | 15.8 | 14.4 | 1.61 | 71.6 | .45 | 63 | 2.0 | 620 | 784 | 806 | 835 | 835 | 761 | 88 |
| Comet x N.No. 1018 | 1315 | 26.4 | 57.4 | 15.5 | 14.8 | 1.57 | 67.6 | .45 | 65 | 2.0 | 638 | 746 | 775 | 801 | 801 | 740 | 90 |
| Comet-Pilot x Comet-1121 | 1656 | 20.4 | 58.7 | 16.1 | 15.3 | 1.61 | 70.0 | .44 | 65 | 2.0 | 655 | 789 | 724 | 780 | 789 | 737 | 88 |
| Comet-1110 x Pilot | 1655 | 21.4 | 59.6 | 15.4 | 14.3 | 1.63 | 70.2 | .46 | 63 | 2.0 | 654 | 781 | 743 | 764 | 781 | 736 | 86 |
| Reliance-1018 | 1506 | 23.6 | 53.8 | 16.1 | 15.2 | 1.59 | 69.5 | .40 | 65 | 2.0 | 576 | 778 | 761 | 752 | 778 | 717 | 81 |
| Average | | 21.3 | 58.4 | 16.2 | 15.1 | 1.63 | 70.4 | .47 | 65 | 2.0 | 691 | 831 | 839 | 861 | 867 | 806 | 89 |
| Range | | 14.6 | 4.7 | 2.1 | 2.9 | 0.38 | 5.6 | .18 | 5 | 1.0 | 297 | 222 | 247 | 236 | 210 | 229 | 10 |

1/ Two pounds from each of the Moccasin and Havre stations.
2/ Standard error (Variety x Method interaction) for a single determination = 33.0 cc.

Table 21. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in the Station Nursery at Mandan, N. Dak., in 1941

| Variety or cross | Nursery number | Acro yield (Bu.) | Test weight (lbs.) | Protein content | | Wheat ash | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|-----------------------|----------------|------------------|--------------------|-----------------|-------|-----------|-------|-----|-------------------------|--------------------|----------------------------------|-------|-------|-------|----------|-----------|--------------------------------|-----------------------------|-------------------------------|
| | | | | Wheat | Flour | | Yield | Ash | | | No. 1 | No. 2 | No. 3 | No. 6 | Opti-mum | Ave-range | | | |
| | | | | | | | | | | | | | | | | | | | |
| Thatcher | ---- | 39.7 | 60.7 | 14.4 | 12.9 | 1.43 | 70.5 | .40 | 63 | 2.0 | 719 | 838 | 885 | 891 | 891 | 833 | 148 | 85 | 85 |
| Comet-1121 x Ceres- | | | | | | | | | | | | | | | | | | | |
| Hope-Florence | 1523-1-1 | 44.7 | 61.7 | 15.1 | 14.0 | 1.64 | 70.1 | .53 | 63 | 2.0 | 680 | 806 | 792 | 801 | 806 | 770 | 150 | 84 | 83 |
| Merit x Pilot | 1652 | 48.7 | 61.1 | 14.7 | 13.7 | 1.42 | 67.7 | .46 | 66 | 2.0 | 654 | 798 | 781 | 812 | 812 | 761 | 152 | 85 | 84 |
| Comet-Pilot x | | | | | | | | | | | | | | | | | | | |
| Comet-1121 | 1689 | 48.9 | 61.1 | 15.1 | 13.8 | 1.45 | 70.1 | .45 | 67 | 2.0 | 675 | 775 | 769 | 781 | 781 | 750 | 154 | 85 | 83 |
| Comet-1110 x H-44- | | | | | | | | | | | | | | | | | | | |
| Ceres | 1693 | 42.6 | 61.9 | 14.4 | 13.5 | 1.45 | 70.6 | .46 | 67 | 2.0 | 614 | 775 | 792 | 767 | 792 | 737 | 154 | 78 | 79 |
| Merit x Komar-Hussar- | | | | | | | | | | | | | | | | | | | |
| Ceres | 1685 | 45.7 | 61.7 | 14.2 | 12.9 | 1.37 | 70.2 | .38 | 68 | 2.5 | 614 | 792 | 738 | 737 | 792 | 720 | 155 | 85 | 83 |
| 1131-Pilot x Komar- | | | | | | | | | | | | | | | | | | | |
| Hussar-Ceres | 1695 | 48.3 | 61.2 | 14.7 | 13.9 | 1.51 | 69.5 | .34 | 65 | 2.0 | 617 | 769 | 717 | 727 | 769 | 708 | 153 | 84 | 85 |
| Comet-1018 x Mercury | 1694 | 41.4 | 59.6 | 15.1 | 14.0 | 1.53 | 70.7 | .37 | 65 | 2.0 | 581 | 749 | 729 | 752 | 752 | 703 | 155 | 85 | 81 |
| Reliance-Hope x | | | | | | | | | | | | | | | | | | | |
| Comet-1121 | 1519-1 | 38.0 | 62.3 | 14.6 | 13.2 | 1.53 | 70.0 | .42 | 63 | 2.0 | 599 | 770 | 741 | 691 | 770 | 700 | 150 | 80 | 79 |
| Comet-1110 x H-44- | | | | | | | | | | | | | | | | | | | |
| Ceres | 1673 | 48.8 | 61.3 | 14.0 | 12.8 | 1.40 | 70.1 | .42 | 65 | 2.0 | 576 | 755 | 743 | 703 | 755 | 694 | 151 | 68 | 76 |
| Merit x Komar-Hussar- | | | | | | | | | | | | | | | | | | | |
| Ceres | 1688 | 43.4 | 60.8 | 13.6 | 12.7 | 1.52 | 69.9 | .48 | 68 | 2.5 | 587 | 755 | 692 | 734 | 755 | 692 | 156 | 83 | 80 |
| Merit x Thatcher | 1687 | 47.1 | 61.0 | 13.7 | 13.0 | 1.46 | 72.5 | .44 | 66 | 2.0 | 581 | 718 | 735 | 721 | 735 | 689 | 153 | 79 | 73 |
| 1131-Pilot x Renown | 1674 | 43.8 | 61.8 | 14.0 | 12.6 | 1.33 | 68.4 | .36 | 63 | 2.0 | 564 | 727 | 740 | 719 | 740 | 688 | 151 | 83 | 79 |
| Reliance-1018 x | | | | | | | | | | | | | | | | | | | |
| Mercury | 1641 | 50.1 | 59.5 | 13.7 | 12.2 | 1.53 | 69.7 | .41 | 63 | 2.0 | 532 | 674 | 658 | 629 | 674 | 623 | 153 | 81 | 75 |
| H-44-Ceres-Marquis | | | | | | | | | | | | | | | | | | | |
| x Mercury | 1670 | 47.9 | 60.6 | 14.0 | 12.9 | 1.44 | 71.3 | .38 | 63 | 2.0 | 480 | 651 | 623 | 581 | 651 | 584 | 151 | 76 | 71 |
| Average | | 45.3 | 61.1 | 14.4 | 13.2 | 1.47 | 70.1 | .42 | 65 | 2.1 | 605 | 757 | 742 | 736 | 765 | 710 | 152 | 81 | 80 |
| Range | | 7.3 | 1.6 | 1.4 | 1.8 | 0.31 | 2.4 | .19 | 5 | 0.5 | 239 | 187 | 262 | 310 | 240 | 249 | 8 | 17 | 14 |

1/ Standard error (Variety x Method interaction) for a single determination = 20.4 cc.

Table 22. - Yield, milling, baking, and chemical results obtained on 15 hard red spring wheats grown in the Station Nursery at Langdon, N. Dak., in 1941

| Variety or cross | Nursery number | Acre yield (Bu.) | Test weight (lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Baking method and loaf volume | | Average weight of loaf (Grams) | Average crumb color (Score) | Average grain texture (Score) |
|--|----------------|------------------|--------------------|-----------------|-------|------------------|-------|-----|-------------------------|--------------------|-------------------------------|------------|--------------------------------|-----------------------------|-------------------------------|
| | | | | Wheat | Flour | | Yield | Ash | | | No. 2 (Cc) | No. 6 (Cc) | | | |
| Pilot | 1098-13 | 18.1 | 55.2 | 17.7 | 16.5 | 2.01 | 69.2 | .58 | 66 | 2.0 | 824 | 1024 | 924 | 151 | 85 |
| Thatcher | ----- | 20.5 | 56.6 | 15.2 | 14.1 | 1.84 | 75.1 | .56 | 64 | 2.0 | 818 | 956 | 887 | 150 | 88 |
| Comet-1110 x H-44-Ceres | 1586 | 25.4 | 58.2 | 16.2 | 15.1 | 1.76 | 75.8 | .58 | 66 | 2.0 | 795 | 965 | 880 | 151 | 85 |
| Ceres-Double Cross x Ceres-Hope-Florence | Ms. 2829 | 28.1 | 61.0 | 16.3 | 15.0 | 1.63 | 73.7 | .49 | 63 | 2.0 | 749 | 965 | 857 | 154 | 83 |
| Merit x Thatcher | 1530-5 | 21.2 | 55.7 | 17.5 | 16.5 | 2.00 | 70.3 | .63 | 68 | 2.0 | 737 | 951 | 844 | 153 | 80 |
| Merit x Thatcher | 1530-7 | 21.5 | 55.9 | 17.8 | 16.9 | 2.00 | 71.7 | .69 | 67 | 2.0 | 740 | 946 | 843 | 155 | 80 |
| Comet-Pilot x Comet-1121 | 1711 | 19.5 | 56.6 | 16.4 | 14.9 | 1.70 | 71.5 | .55 | 67 | 2.0 | 775 | 908 | 842 | 153 | 78 |
| Comet-1121 x Ceres-Hope-Florence | 1713 | 19.4 | 56.8 | 16.3 | 15.1 | 1.91 | 73.7 | .58 | 66 | 2.0 | 729 | 948 | 839 | 152 | 78 |
| Reliance-Hope x H-44-Ceres | 1712 | 17.1 | 57.0 | 17.4 | 16.2 | 1.91 | 69.9 | .57 | 66 | 2.0 | 738 | 937 | 838 | 152 | 75 |
| H-44-Ceres-Marquis x Comet-Pilot | 1636 | 20.4 | 55.6 | 16.0 | 15.1 | 1.83 | 71.9 | .62 | 67 | 2.0 | 755 | 920 | 838 | 152 | 75 |
| Reliance-1018 x Mercury | 1686 | 19.6 | 55.0 | 16.1 | 14.9 | 1.92 | 76.5 | .63 | 66 | 2.0 | 737 | 925 | 831 | 153 | 80 |
| Comet-1110 x H-44-Ceres | 1588 | 19.9 | 57.1 | 16.4 | 15.7 | 1.89 | 74.2 | .68 | 64 | 2.0 | 727 | 922 | 825 | 151 | 78 |
| Comet-1110 x H-44-Ceres | 1590 | 21.2 | 58.5 | 16.2 | 15.5 | 1.69 | 73.5 | .64 | 66 | 2.0 | 732 | 911 | 822 | 153 | 70 |
| 1131-Pilot x Renown | 1709 | 13.8 | 52.5 | 18.4 | 17.0 | 2.14 | 70.0 | .70 | 66 | 2.0 | 721 | 888 | 805 | 155 | 68 |
| Reliance-1018 x Mercury | 1710 | 20.5 | 55.9 | 15.8 | 15.0 | 1.84 | 73.3 | .69 | 69 | 2.0 | 721 | 879 | 800 | 156 | 75 |
| Average | | 20.6 | 56.5 | 16.6 | 15.6 | 1.87 | 72.7 | .61 | 66 | 2.0 | 753 | 936 | 845 | 153 | 79 |
| Range | | 3.5 | 8.5 | 3.2 | 2.9 | 0.51 | 7.3 | .21 | 5 | --- | 103 | 145 | 124 | 6 | 13 |

Bromate Response Methods

The response to varying amounts of potassium bromate (0 to 3 milligrams per 100 grams of flour) is shown in tables 23 and 24. These results verify in a general way those for the 1940 crop, where on the average 1 milligram of bromate produced a larger loaf volume and additional amounts of bromate decreased or showed no marked change in loaf volume. Samples of 4 spring wheats and 4 winter wheats were obtained from the Sheridan, Wyo., station where they were grown on similarly prepared fallow, to determine if comparable high protein spring wheats would respond to increasing amounts of bromate as has been found for winter wheat in the Hard Winter Wheat Quality Laboratory. The results shown in table 23 indicate that spring wheats will not usually respond to additional amounts of bromate over the 1 milligram used in the No. 6 bake. Results for the eight uniform varieties are shown in table 24. The milling and chemical results for these tests are shown in table 2.

Minnesota and North Dakota Laboratory Methods

The same composite flours of the eight uniform varieties were baked by the methods used by the Minnesota and North Dakota laboratories. One-third of the flours were also sent to each of these laboratories for similar tests. The results from the U.S.D.A. tests are shown in tables 25 and 26.

The results from the Minnesota methods in table 25 show that the 2-hour fermentation and 2-minute mix give the optimum volumes, although smaller than the No. 1 bake of the regular U.S.D.A. methods. This is due in part to scaling the dough before baking to a uniform weight of 150 grams for all varieties. This loss is indicated further in the weight of loaf.

The results from the single North Dakota malt-phosphate-bromate method shown in table 26 are given in duplicate for volume, as the loaves were baked on different days. The average volumes are larger than those of the best Minnesota method but smaller than the regular No. 6 method of the U.S.D.A. laboratory.

The average and optimum volumes for the different laboratory methods, together with the ranks of the varieties, are shown in tables 27 and 28. The varieties are arranged in order of the average volumes, also expressed in percentage of Thatcher. The ranks for the different laboratory methods are not as consistent as desired and indicate that the varieties respond differently to different baking procedures. Pilot, which had the largest average volumes by the U.S.D.A. methods, was relatively low by the North Dakota method and represents the largest variation in rank.

Table 23. Yield, milling, baking, and chemical results on 4 spring wheats and 4 winter wheats from Hard Red Winter Wheat Laboratory methods showing bromate response on the two classes of wheat, grown on comparable fallow land at Sheridan, Wyo., in 1940-41

| Variety or cross | C.I. number | Acro yield (Bu.) | Test weight (Lbs.) | Protein content | | Wheat ash (Pct.) | Flour | | Water absorption (Pct.) | Mixing time (Min.) | Milligrams of bromate and volume of loaf | | | | | Average | | | |
|------------------|-------------|------------------|--------------------|-----------------|--------------|------------------|--------------|------------|-------------------------|--------------------|--|--------|--------|--------|-------------------|--------------------|------------------------|---------------|----|
| | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | 0 (Cc) | 1 (Cc) | 2 (Cc) | 3 (Cc) | Opti- mum (Cc) | Avo- range (Cc) | Weight of loaf (Grams) | Grain texture | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Hard Red Spring | | | | | | | | | | | | | | | | | | | |
| Thatcher | 10003 | 28.4 | 56.5 | 17.5 | 17.0 | 1.65 | 69.8 | .47 | 66 | 2.0 | 902 | 1106 | 1127 | 1101 | 1127 | 1059 | 146 | 85 | 82 |
| Philot | 11945 | 27.2 | 56.7 | 17.2 | 15.7 | 1.70 | 66.8 | .50 | 64 | 2.0 | 1038 | 1035 | 954 | 934 | 1038 | 990 | 147 | 89 | 79 |
| Merit x Thatcher | 12053 | 21.4 | 55.0 | 17.0 | 16.8 | 1.88 | 66.9 | .55 | 66 | 2.0 | 792 | 905 | 923 | 917 | 923 | 884 | 150 | 86 | 82 |
| Merit-3 | 12036 | 26.3 | 55.1 | 17.0 | 15.6 | 1.70 | 70.5 | .56 | 67 | 2.0 | 841 | 902 | 920 | 850 | 920 | 878 | 151 | 82 | 80 |
| Average | | 25.8 | 55.8 | 17.2 | 16.3 | 1.73 | 68.5 | .52 | 66 | 2.0 | 893 | 987 | 981 | 951 | 1002 | 953 | 149 | 86 | 81 |
| Range | | 7.0 | 1.7 | 0.5 | 1.4 | 0.23 | 3.7 | .09 | 3 | --- | 246 | 204 | 207 | 251 | 207 | 181 | 5 | 7 | 3 |
| Hard Red Winter | | | | | | | | | | | | | | | | | | | |
| Minturki | 6155 | 33.3 | 55.7 | 18.3 | 17.5 | 1.68 | 66.8 | .42 | 60 | 2.0 | 752 | 893 | 1084 | 1139 | 1139 | 967 | 145 | 74 | 75 |
| Nebred | 10094 | 36.4 | 57.1 | 16.7 | 16.3 | 1.70 | 68.6 | .40 | 63 | 2.5 | 780 | 891 | 925 | 951 | 951 | 887 | 149 | 79 | 81 |
| Karred | 5146 | 34.8 | 56.0 | 17.8 | 17.1 | 1.74 | 70.4 | .45 | 64 | 2.0 | 700 | 824 | 911 | 1021 | 1021 | 864 | 149 | 76 | 76 |
| Karmont | 6700 | 38.2 | 58.9 | 15.3 | 14.5 | 1.61 | 69.4 | .39 | 64 | 2.0 | 641 | 761 | 847 | 853 | 853 | 776 | 151 | 82 | 80 |
| Average | | 35.7 | 56.9 | 17.0 | 16.4 | 1.63 | 68.8 | .42 | 63 | 2.1 | 718 | 842 | 942 | 991 | 991 | 873 | 149 | 78 | 73 |
| Range | | 4.9 | 3.2 | 3.0 | 3.0 | 0.13 | 3.6 | .06 | 4 | 0.5 | 139 | 132 | 237 | 236 | 206 | 191 | 6 | 8 | 6 |

Table 24. - Baking results showing bromate response for the eastern and western composites and their average of the 8 uniform varieties grown in plot experiments in 1941

| Composite and variety | Milligrams of bromate and volume of loaf | | | | | | Average | | |
|--|--|-----------|-----------|-----------|----------------------|-----------------|------------------------------|-----------------------------|---------------------------|
| | 0 (Cc) | 1 (Cc) | 2 (Cc) | 3 (Cc) | Opti- mum (Cc) | Average (Cc) | Weight of loaf (Grams) | Grain texture (Score) | Crumb color (Score) |
| <u>Eastern Composite</u> | | | | | | | | | |
| Renown | 936 | 933 | 928 | 850 | 936 | 912 | 149 | 85 | 84 |
| Marquis | 885 | 928 | 922 | 856 | 928 | 898 | 151 | 83 | 80 |
| Thatcher | 916 | 928 | 882 | 806 | 928 | 883 | 151 | 84 | 83 |
| Pilot | 974 | 931 | 832 | 775 | 974 | 878 | 150 | 81 | 86 |
| Ceres | 917 | 925 | 885 | 783 | 925 | 878 | 151 | 84 | 80 |
| Merit | 899 | 930 | 868 | 786 | 930 | 871 | 153 | 84 | 84 |
| Rival | 920 | 914 | 821 | 744 | 920 | 850 | 152 | 83 | 85 |
| Premier | 876 | 870 | 838 | 772 | 876 | 839 | 152 | 83 | 89 |
| Average | 915 | 920 | 872 | 797 | 927 | 876 | 151 | 83 | 84 |
| Range | 98 | 63 | 107 | 112 | 98 | 73 | 4 | 4 | 9 |
| <u>Western Composite</u> | | | | | | | | | |
| Pilot | 1030 | 1044 | 988 | 936 | 1044 | 1000 | 147 | 86 | 89 |
| Thatcher | 960 | 982 | 1006 | 933 | 1006 | 970 | 150 | 85 | 86 |
| Marquis | 879 | 965 | 1003 | 916 | 1003 | 941 | 151 | 89 | 83 |
| Ceres | 928 | 951 | 902 | 891 | 951 | 918 | 151 | 88 | 88 |
| Rival | 931 | 948 | 882 | 902 | 948 | 916 | 152 | 86 | 90 |
| Renown | 879 | 937 | 925 | 908 | 937 | 912 | 149 | 90 | 89 |
| Merit | 881 | 925 | 902 | 921 | 925 | 907 | 153 | 86 | 91 |
| Premier | 798 | 781 | 764 | 752 | 798 | 774 | 158 | 83 | 90 |
| Average | 911 | 942 | 922 | 895 | 952 | 917 | 151 | 87 | 88 |
| Range | 232 | 263 | 242 | 184 | 246 | 226 | 11 | 7 | 8 |
| <u>Average of Eastern and Western Composites</u> | | | | | | | | | |
| Pilot | 1002 | 988 | 910 | 856 | 1009 | 939 | 149 | 84 | 88 |
| Thatcher | 938 | 955 | 944 | 870 | 967 | 927 | 151 | 85 | 85 |
| Marquis | 882 | 947 | 963 | 886 | 966 | 920 | 151 | 86 | 82 |
| Renown | 908 | 935 | 927 | 879 | 937 | 912 | 149 | 88 | 87 |
| Ceres | 923 | 938 | 894 | 837 | 938 | 898 | 151 | 86 | 84 |
| Merit | 890 | 928 | 885 | 854 | 928 | 889 | 153 | 85 | 88 |
| Rival | 926 | 931 | 852 | 823 | 934 | 883 | 153 | 85 | 88 |
| Premier | 837 | 826 | 801 | 762 | 837 | 807 | 155 | 83 | 90 |
| Average | 913 | 931 | 897 | 846 | 940 | 897 | 151 | 85 | 86 |
| Range | 165 | 162 | 162 | 124 | 172 | 132 | 6 | 5 | 8 |

Table 25. - Baking results from Minnesota Laboratory methods showing reaction to different fermentation and mixing times for the eastern and western composites and their averages of the 8 uniform varieties grown in plot experiments in 1941

| Composite and variety | 2-hour fermentation | | 3-hour fermentation | | Optimum volume | Average volume | Weight of loaf | Average | |
|---|---------------------|------------|---------------------|------------|----------------|----------------|----------------|-------------|---------------|
| | 2-min. mix | 4-min. mix | 2-min. mix | 4-min. mix | | | | Crumb color | Grain texture |
| | (Cc) | (Cc) | (Cc) | (Cc) | | | | | |
| Eastern Composite | | | | | | | | | |
| Renown | 829 | 737 | 760 | 611 | 829 | 734 | 123 | 80 | 70 |
| Rival | 770 | 803 | 651 | 587 | 803 | 703 | 122 | 80 | 69 |
| Ceres | 806 | 652 | 707 | 632 | 806 | 699 | 123 | 68 | 68 |
| Thatcher | 787 | 666 | 678 | 632 | 787 | 691 | 124 | 73 | 74 |
| Marquis | 764 | 680 | 703 | 596 | 764 | 686 | 123 | 75 | 75 |
| Pilot | 789 | 710 | 663 | 576 | 789 | 685 | 124 | 83 | 75 |
| Merit | 710 | 677 | 672 | 641 | 710 | 675 | 124 | 78 | 71 |
| Premier | 686 | 620 | 605 | 520 | 686 | 608 | 124 | 79 | 69 |
| Average | 768 | 693 | 680 | 599 | 772 | 685 | 123 | 77 | 71 |
| Range | 143 | 183 | 155 | 121 | 143 | 126 | 2 | 15 | 7 |
| Western Composite | | | | | | | | | |
| Thatcher | 832 | 709 | 713 | 590 | 832 | 711 | 123 | 83 | 73 |
| Marquis | 743 | 648 | 734 | 649 | 743 | 694 | 123 | 76 | 73 |
| Pilot | 817 | 694 | 700 | 506 | 817 | 679 | 123 | 81 | 73 |
| Ceres | 766 | 632 | 682 | 573 | 766 | 663 | 124 | 80 | 71 |
| Rival | 729 | 677 | 657 | 564 | 729 | 657 | 124 | 80 | 70 |
| Renown | 724 | 617 | 677 | 503 | 724 | 630 | 124 | 79 | 73 |
| Merit | 686 | 596 | 632 | 517 | 686 | 608 | 124 | 79 | 65 |
| Premier | 596 | 544 | 547 | 434 | 596 | 530 | 125 | 73 | 60 |
| Average | 737 | 640 | 668 | 542 | 737 | 647 | 124 | 79 | 70 |
| Range | 236 | 165 | 187 | 215 | 236 | 181 | 2 | 10 | 13 |
| Average of Eastern and Western Composites | | | | | | | | | |
| Thatcher | 810 | 688 | 696 | 611 | 810 | 701 | 124 | 78 | 74 |
| Marquis | 754 | 664 | 719 | 623 | 754 | 690 | 123 | 76 | 74 |
| Pilot | 803 | 702 | 682 | 541 | 803 | 682 | 124 | 82 | 74 |
| Ceres | 786 | 642 | 695 | 603 | 786 | 682 | 124 | 74 | 70 |
| Renown | 777 | 677 | 719 | 557 | 777 | 683 | 124 | 80 | 72 |
| Rival | 750 | 740 | 654 | 576 | 766 | 680 | 123 | 80 | 70 |
| Merit | 698 | 637 | 652 | 579 | 698 | 642 | 124 | 79 | 68 |
| Premier | 641 | 582 | 576 | 477 | 641 | 569 | 125 | 76 | 65 |
| Average | 752 | 667 | 674 | 571 | 754 | 666 | 124 | 78 | 71 |
| Range | 169 | 158 | 120 | 146 | 169 | 132 | 2 | 8 | 9 |

Table 26. - Baking results from North Dakota Laboratory methods showing malt-phosphatobromate response and individual replications on different days for the eastern and western composites and their average of the 8 uniform varieties grown in plot experiments in 1941

| Composite and variety | Replication | | Average loaf volume (Cc) | Weight of loaf (Grams) | Average | |
|--|-------------|-----------|-----------------------------------|------------------------------|---------------------------|-----------------------------|
| | 1 (Cc) | 2 (Cc) | | | Crumb color (Score) | Grain texture (Score) |
| <u>Eastern Composite</u> | | | | | | |
| Renown | 803 | 826 | 815 | 138 | 65 | 60 |
| Ceres | 862 | 758 | 810 | 136 | 58 | 60 |
| Marquis | 764 | 820 | 792 | 137 | 65 | 70 |
| Merit | 734 | 769 | 752 | 138 | 68 | 63 |
| Thatcher | 734 | 724 | 729 | 135 | 65 | 68 |
| Pilot | 672 | 729 | 701 | 135 | 70 | 63 |
| Rival | 729 | 672 | 701 | 139 | 68 | 65 |
| Premier | 713 | 682 | 698 | 137 | 68 | 60 |
| Average | 751 | 748 | 750 | 137 | 66 | 64 |
| Range | 190 | 154 | 117 | 4 | 12 | 10 |
| <u>Western Composite</u> | | | | | | |
| Thatcher | 942 | 942 | 942 | 131 | 78 | 73 |
| Marquis | 832 | 885 | 859 | 136 | 70 | 75 |
| Renown | 820 | 850 | 835 | 134 | 80 | 75 |
| Pilot | 792 | 780 | 786 | 135 | 78 | 73 |
| Merit | 764 | 769 | 767 | 136 | 80 | 73 |
| Ceres | 775 | 758 | 767 | 135 | 75 | 73 |
| Rival | 769 | 752 | 761 | 138 | 78 | 73 |
| Premier | 718 | 694 | 706 | 139 | 73 | 60 |
| Average | 802 | 804 | 803 | 136 | 77 | 72 |
| Range | 224 | 248 | 236 | 8 | 7 | 15 |
| <u>Average of Eastern and Western Composites</u> | | | | | | |
| Thatcher | 838 | 833 | 836 | 133 | 72 | 71 |
| Marquis | 798 | 853 | 826 | 137 | 68 | 73 |
| Renown | 812 | 838 | 825 | 136 | 73 | 68 |
| Ceres | 819 | 758 | 789 | 136 | 67 | 67 |
| Merit | 749 | 769 | 759 | 137 | 74 | 68 |
| Pilot | 732 | 755 | 744 | 135 | 74 | 68 |
| Rival | 749 | 712 | 731 | 139 | 73 | 69 |
| Premier | 716 | 688 | 702 | 138 | 71 | 60 |
| Average | 777 | 776 | 777 | 136 | 78 | 68 |
| Range | 122 | 165 | 134 | 6 | 7 | 13 |

Table 27. - Average loaf volumes on the 8 uniform varieties from four laboratory methods on the eastern and western composites and for their average, together with percentages and ranks, for 1941

| Composite and variety | Laboratory method and volume of loaf | | | | | Per- cent- age of That- cher | Ranks | | | |
|---|--------------------------------------|---|--------------------------|----------------------------|---------------------|--|--------------------------------|---|--------------------------|-------------------------------|
| | U. S. D. A. | | Minn. (4) (Cc) | N. Dak. (1) (Cc) | Average (Cc) | | U. S. D. A. | | Minn. (4) (Cc) | N. Dak. (1) (Cc) |
| | Belts- ville (4) (Cc) | Bromate re- sponse (4) (Cc) | | | | | Belts- ville (4) (Cc) | Bromate re- sponse (4) (Cc) | | |
| | | | | | | | | | | |
| Eastern Composite | | | | | | | | | | |
| Renown | 905 | 912 | 734 | 815 | 842 | 105.1 | 2 | 1 | 1 | 1 |
| Ceres | 920 | 877 | 699 | 810 | 827 | 103.2 | 1 | 5 | 3 | 2 |
| Marquis | 863 | 898 | 686 | 792 | 810 | 101.1 | 6 | 2 | 5 | 3 |
| Thatcher | 901 | 883 | 691 | 729 | 801 | 100.0 | 3 | 3 | 4 | 5 |
| Pilot | 897 | 878 | 685 | 701 | 790 | 98.6 | 4 | 4 | 6 | 6.5 |
| Merit | 851 | 871 | 675 | 752 | 787 | 98.3 | 7 | 6 | 7 | 4 |
| Rival | 888 | 850 | 703 | 701 | 786 | 98.1 | 5 | 7 | 2 | 6.5 |
| Premier | 818 | 839 | 602 | 693 | 741 | 92.5 | 8 | 8 | 8 | 8 |
| Average | 880 | 876 | 685 | 750 | 798 | 99.6 | | | | |
| Range | 102 | 73 | 126 | 117 | 101 | 12.6 | | | | |
| Western Composite | | | | | | | | | | |
| Thatcher | 910 | 970 | 711 | 942 | 883 | 100.0 | 2 | 2 | 1 | 1 |
| Pilot | 956 | 1000 | 679 | 786 | 855 | 96.8 | 1 | 1 | 3 | 4 |
| Marquis | 849 | 941 | 694 | 859 | 836 | 94.7 | 5 | 3 | 2 | 2 |
| Ceres | 867 | 918 | 663 | 767 | 804 | 91.1 | 3 | 4 | 4 | 5.5 |
| Renown | 834 | 912 | 630 | 835 | 803 | 90.9 | 6 | 6 | 6 | 3 |
| Rival | 859 | 916 | 657 | 761 | 798 | 90.4 | 4 | 5 | 5 | 7 |
| Merit | 814 | 907 | 608 | 767 | 774 | 87.7 | 7 | 7 | 7 | 5.5 |
| Premier | 720 | 774 | 530 | 706 | 683 | 77.3 | 8 | 8 | 8 | 8 |
| Average | 851 | 917 | 647 | 803 | 805 | 91.2 | | | | |
| Range | 236 | 226 | 181 | 236 | 200 | 22.7 | | | | |
| Average of Eastern and Western Composites | | | | | | | | | | |
| Thatcher | 906 | 927 | 701 | 836 | 843 | 100.0 | 2 | 2 | 1 | 1 |
| Pilot | 927 | 939 | 682 | 744 | 823 | 97.6 | 1 | 1 | 3.5 | 6 |
| Marquis | 856 | 920 | 690 | 826 | 823 | 97.6 | 6 | 3 | 2 | 2 |
| Renown | 870 | 912 | 682 | 825 | 822 | 97.5 | 5 | 4 | 3.5 | 3 |
| Ceres | 894 | 898 | 681 | 789 | 816 | 96.8 | 3 | 5 | 5 | 4 |
| Rival | 874 | 883 | 680 | 731 | 792 | 94.0 | 4 | 7 | 6 | 7 |
| Merit | 833 | 889 | 642 | 760 | 781 | 92.6 | 7 | 6 | 7 | 5 |
| Premier | 769 | 807 | 569 | 702 | 712 | 84.5 | 8 | 8 | 8 | 8 |
| Average | 866 | 897 | 666 | 777 | 802 | 95.1 | | | | |
| Range | 158 | 132 | 132 | 134 | 131 | 15.5 | | | | |

Table 28. - Optimum loaf volumes on the 8 uniform varieties from four laboratory baking methods on the eastern and western composites and for their average, together with percentages and ranks

| Composite and variety | Laboratory method and volume of loaf | | | | | Per- cent- age of That- cher | Ranks | | | |
|---|--------------------------------------|---------------------------------|-------|---------|---------|--|-----------------|-------------------------------|-------|------------|
| | U. S. D. A. | | Minn. | N. Dak. | Average | | U. S. D. A. | | Minn. | N. Dak. |
| | Belts- ville (4) | Bromate re- sponse (4) | | | | | Belts- ville | Bro- mate re- sponse | | |
| | | | | | | | | | | |
| (Cc) | (Cc) | (Cc) | (Cc) | (Cc) | | | | | | |
| Eastern Composite | | | | | | | | | | |
| Ceres | 976 | 925 | 806 | 810 | 879 | 104.3 | 1 | 6 | 2 | 2 |
| Renown | 934 | 936 | 829 | 815 | 879 | 104.3 | 3 | 2 | 1 | 1 |
| Marquis | 928 | 928 | 764 | 792 | 853 | 101.2 | 6.5 | 4.5 | 6 | 3 |
| Pilot | 931 | 974 | 789 | 701 | 849 | 100.7 | 4 | 1 | 4 | 6.5 |
| Thatcher | 928 | 928 | 787 | 729 | 843 | 100.0 | 6.5 | 4.5 | 5 | 5 |
| Rival | 942 | 920 | 803 | 701 | 842 | 99.9 | 2 | 7 | 3 | 6.5 |
| Merit | 930 | 930 | 710 | 752 | 831 | 98.6 | 5 | 3 | 7 | 4 |
| Premier | 870 | 876 | 686 | 698 | 783 | 92.9 | 8 | 8 | 8 | 8 |
| Average | 930 | 927 | 772 | 750 | 845 | 100.2 | | | | |
| Range | 106 | 98 | 143 | 117 | 96 | 11.4 | | | | |
| Western Composite | | | | | | | | | | |
| Thatcher | 982 | 1006 | 832 | 942 | 941 | 100.0 | 2 | 2 | 1 | 1 |
| Pilot | 1044 | 1044 | 817 | 786 | 923 | 98.1 | 1 | 1 | 2 | 4 |
| Marquis | 965 | 1003 | 743 | 859 | 893 | 94.9 | 3 | 3 | 4 | 2 |
| Ceres | 951 | 951 | 766 | 767 | 859 | 91.3 | 4 | 4 | 3 | 5.5 |
| Renown | 937 | 937 | 724 | 835 | 858 | 91.2 | 6 | 6 | 6 | 3 |
| Rival | 948 | 948 | 729 | 761 | 847 | 90.0 | 5 | 5 | 5 | 7 |
| Merit | 925 | 925 | 686 | 767 | 826 | 87.8 | 7 | 7 | 7 | 5.5 |
| Premier | 781 | 798 | 596 | 706 | 720 | 76.5 | 8 | 8 | 8 | 8 |
| Average | 942 | 952 | 737 | 803 | 859 | 91.3 | | | | |
| Range | 263 | 246 | 236 | 236 | 221 | 23.5 | | | | |
| Average of Eastern and Western Composites | | | | | | | | | | |
| Thatcher | 955 | 967 | 810 | 836 | 892 | 100.0 | 3 | 2 | 1 | 1 |
| Pilot | 988 | 1009 | 803 | 744 | 886 | 99.3 | 1 | 1 | 2 | 6 |
| Marquis | 947 | 966 | 754 | 826 | 873 | 97.9 | 4 | 3 | 6 | 2 |
| Ceres | 964 | 930 | 736 | 739 | 869 | 97.4 | 2 | 4 | 3 | 4 |
| Renown | 936 | 937 | 777 | 825 | 869 | 97.4 | 6 | 5 | 4 | 3 |
| Rival | 945 | 934 | 766 | 731 | 844 | 94.6 | 5 | 6 | 5 | 7 |
| Merit | 928 | 928 | 698 | 760 | 829 | 92.9 | 7 | 7 | 7 | 5 |
| Premier | 826 | 837 | 641 | 702 | 752 | 84.3 | 8 | 8 | 8 | 8 |
| Average | 936 | 940 | 754 | 777 | 852 | 95.5 | | | | |
| Range | 162 | 172 | 169 | 134 | 140 | 15.7 | | | | |

Commercial Grade Samples

In order to obtain information on the milling, baking, and chemical properties of the commercial grades of wheat grown by farmers, for comparison with the quality results obtained on varieties and strains grown in experimental plots and nurseries, samples were obtained by the United States Department of Agriculture, through the Agricultural Marketing Administration, Grain, Feed and Seed Branch.

Nine composited samples representing the better grades were obtained from the Minneapolis, Minn.; Great Falls, Mont.; and Spokane, Wash.; markets. The samples were composited by grade from cars of wheat grading No. 3 or better and represent the leading grades of hard red spring wheat received at these important markets. The quality results are given in table 29.

These samples average lower in protein content than the experimental plot and nursery samples. Otherwise the milling, baking, and chemical results do not appear to be greatly different, especially when based on samples having somewhat similar test weight and protein content.

SUMMARY OF RESULTS

Rather extensive milling, baking, and chemical tests have been made by the regular methods during the 4-year period, 1938 to 1941. As many as 53 samples of Thatcher have been tested during the 4 years. It has been used as a standard of comparison and all other varieties have been compared with it when comparable. The total number of varietal samples tested, however, usually exceeds the number of comparable samples with Thatcher. Brief summaries of some of the results are presented.

Correlation and Regression

Correlation surfaces, regression lines, and the correlation and regression coefficients are shown in figure 1 for flour protein and optimum loaf volume of all samples of Thatcher, Pilot, Rival, and Merit wheats tested of the four crop years, 1938 to 1941, inclusive. The average optimum volumes and flour proteins are also shown, together with their frequency distributions. Important positive correlation coefficients were obtained in all cases varying from +0.463 for Rival to +0.765 for Pilot. Rival had but few high protein samples and the lowest average but the highest regression coefficient, 44.1 cc., while Thatcher had the most high protein samples and average but the lowest regression coefficient, 31.0 cc.

Comparable 1941 Samples with Thatcher

In table 30, the comparable 1941 samples of 19 varieties and strains are averaged and compared in percentage of Thatcher, the leading commercial variety. The varieties are arranged in order of their average loaf volumes for the four regular baking methods and the average of eight quality properties are computed and shown in the last column.

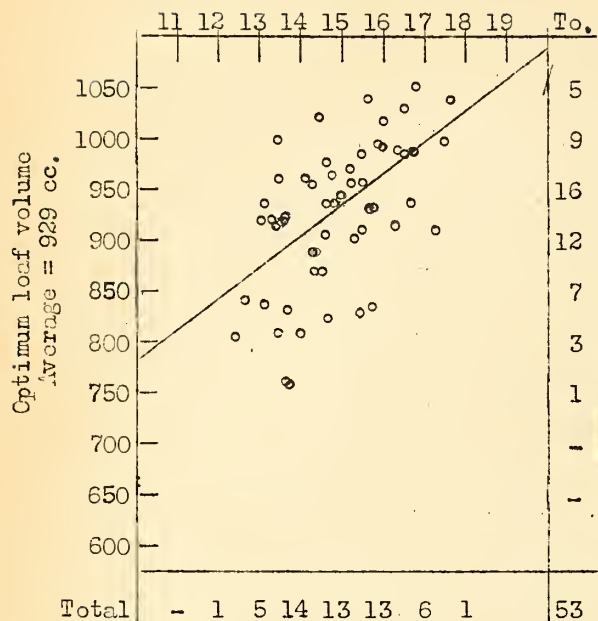
Table 29. - Milling, baking, and chemical results on 9 composite samples of commercial hard red spring wheat grades obtained at Minneapolis, Minn.; Great Falls, Mont.; and Spokane, Wash.; representing the 1941 crop

| Location where obtained | Composited from | U. S. Grade | Test weight (Lbs.) | Protein content | | Wheat ash | Flour | | Water absorption average | Mixing time (Min.) | Baking method and volume of loaf | | | | | | Average weight of loaf (Grams) | Crumb color (Score) | Grain texture (Score) |
|-------------------------|-----------------|---------------|--------------------|-----------------|--------------|-----------|--------------|------------|--------------------------|--------------------|----------------------------------|-------|-------|-------|--------------|--------------|--------------------------------|---------------------|-----------------------|
| | | | | Wheat (Pct.) | Flour (Pct.) | | Yield (Pct.) | Ash (Pct.) | | | No. 1 | No. 2 | No. 3 | No. 6 | Optimum (Cc) | Average (Cc) | | | |
| Minneapolis, Minnesota | ----- | 1 N. S. | 59.5 | 11.8 | 11.1 | 1.59 | 70.4 | .47 | 66 | 2.0 | 649 | 732 | 775 | 789 | 789 | 736 | 149 | 83 | 83 |
| | 67 cars | 1 Hvy. D.N.S. | 60.8 | 13.4 | 12.8 | 1.64 | 72.5 | .54 | 63 | 2.0 | 691 | 793 | 801 | 850 | 850 | 784 | 148 | 88 | 88 |
| | 302 cars | 1 D.N.S. | 59.4 | 13.8 | 13.2 | 1.65 | 71.2 | .49 | 63 | 2.0 | 470 | 821 | 820 | 850 | 850 | 808 | 147 | 83 | 89 |
| | 363 cars | 2 D.N.S. | 58.0 | 14.0 | 13.7 | 1.69 | 71.2 | .50 | 63 | 2.0 | 752 | 870 | 885 | 879 | 885 | 847 | 147 | 85 | 88 |
| | 449 cars | 3 D.N.S. | 57.0 | 14.3 | 13.6 | 1.65 | 70.9 | .51 | 63 | 2.0 | 798 | 882 | 937 | 945 | 945 | 891 | 146 | 86 | 88 |
| Great Falls, Montana | 177 cars | 1 Hvy. D.N.S. | 61.1 | 14.1 | 13.9 | 1.48 | 72.3 | .47 | 61 | 2.0 | 710 | 795 | 847 | 885 | 885 | 809 | 147 | 88 | 93 |
| | 208 cars | 1 D.N.S. | 59.4 | 15.1 | 14.3 | 1.52 | 72.0 | .50 | 61 | 2.0 | 686 | 795 | 865 | 937 | 937 | 821 | 147 | 88 | 86 |
| | 90 cars | 2 D.N.S. | 58.4 | 15.7 | 15.2 | 1.58 | 70.6 | .46 | 63 | 2.0 | 740 | 853 | 963 | 991 | 991 | 887 | 148 | 91 | 86 |
| Spokane, Wash. | 84 cars | 1 D.N.S. | 59.1 | 16.0 | 14.6 | 1.62 | 70.5 | .53 | 63 | 2.0 | 660 | 786 | 879 | 960 | 960 | 821 | 147 | 89 | 85 |

1/ Dockage-free basis.
 2/ 13.5 percent moisture basis.
 3/ Moisture-free basis.

Thatcher

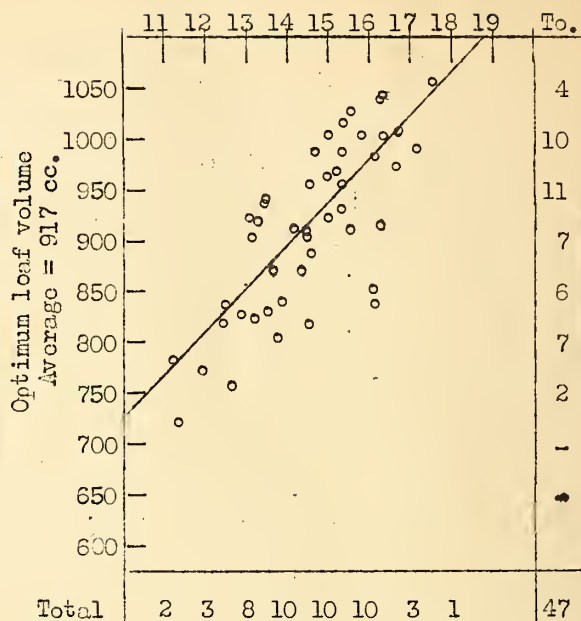
Flour Protein



Average = 14.88
 $r = +0.5675$
 $b_1 = 31.0$

Pilot

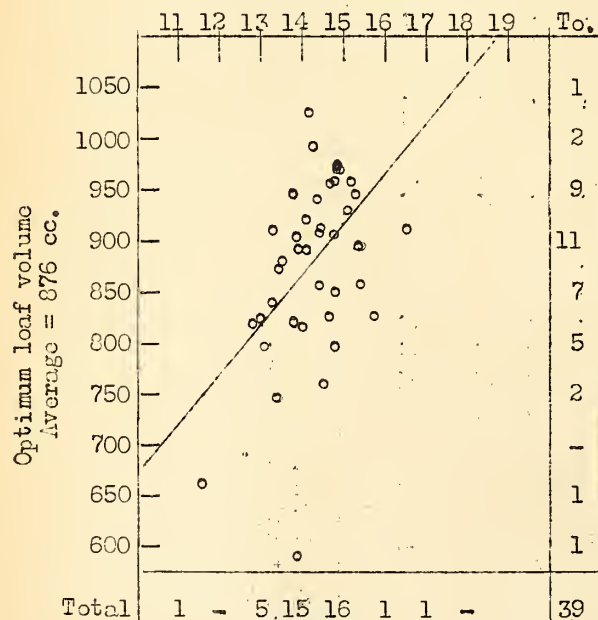
Flour Protein



Average = 14.54
 $r = +0.7646$
 $b_1 = 41.9$

Rival

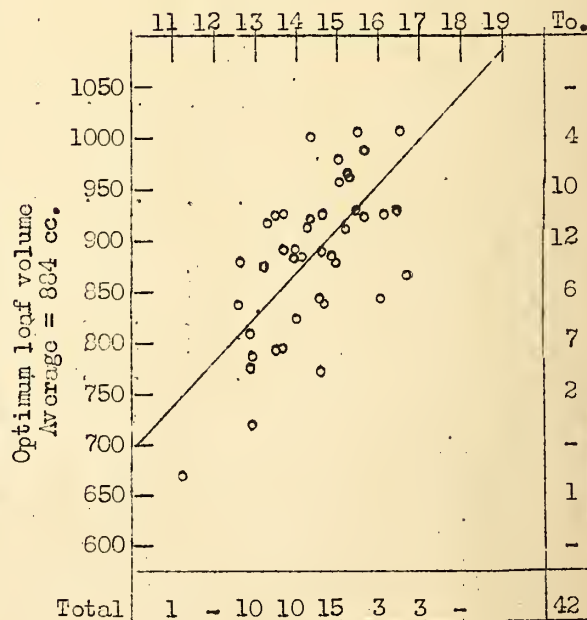
Flour Protein



Average = 14.26
 $r = +0.4631$
 $b_1 = 44.1$

Merit

Flour Protein



Average = 14.35
 $r = +0.6316$
 $b_1 = 38.5$

Table 30. - Average of the milling, baking, and chemical properties of 12 wheat varieties, the average of comparable samples of Thatcher and of each variety in percentage of Thatcher, with the varieties arranged in order of percentage for loaf volume, 1941

| Variety or cross | No. of samples | Test weight per bushel (dockage free) (Pounds) | Crude protein of wheat (Percent) | Yield of flour (Pct.) | Ash in flour (Pct.) | Water absorption of flour (Percent) | Baking method and volume of loaf | | | | Crain 2/ texture (Score) | Crumb 2/ color (Score) | Average of 8 proper ties 3/ |
|---|----------------|--|----------------------------------|-----------------------|---------------------|-------------------------------------|----------------------------------|------------|------------|------------|--------------------------|------------------------|-----------------------------|
| | | | | | | | No. 1 (Cc) | No. 2 (Cc) | No. 3 (Cc) | No. 6 (Cc) | | | |
| Hope x Thatcher ³ , IL-31-9 | 4 | 56.1 | 15.9 | 71.4 | .59 | 65 | 796 | 920 | 923 | 942 | 88 | 85 | |
| Thatcher | 4 | 54.6 | 14.1 | 69.9 | .53 | 63 | 750 | 855 | 907 | 913 | 84 | 76 | |
| Percent of Thatcher | | 102.7 | 112.8 | 102.1 | 111.3 | 103.2 | 106.1 | 107.6 | 101.8 | 103.2 | 104.6 | 111.8 | 103.8 |
| Hope x Thatcher ³ , IL-31-14 | 7 | 55.7 | 15.8 | 70.8 | .56 | 64 | 791 | 891 | 918 | 971 | 83 | 83 | |
| Thatcher | 7 | 55.3 | 14.6 | 70.1 | .52 | 63 | 773 | 874 | 908 | 927 | 80 | 79 | |
| Percent of Thatcher | | 100.4 | 108.2 | 101.0 | 107.7 | 101.6 | 102.3 | 101.9 | 101.1 | 104.7 | 102.5 | 105.1 | 101.4 |
| Regent | 10 | 57.1 | 15.7 | 70.3 | .54 | 64 | 760 | 866 | 955 | 975 | 86 | 84 | |
| Thatcher | 10 | 55.6 | 14.7 | 69.7 | .52 | 63 | 778 | 883 | 909 | 929 | 87 | 81 | |
| Percent of Thatcher | | 102.7 | 106.8 | 100.9 | 103.8 | 101.6 | 97.7 | 98.1 | 105.1 | 105.0 | 101.6 | 98.9 | 101.6 |
| Renown | 13 | 58.4 | 15.8 | 69.9 | .54 | 63 | 761 | 871 | 914 | 939 | 86 | 86 | |
| Thatcher | 13 | 55.8 | 15.2 | 68.7 | .52 | 63 | 780 | 881 | 901 | 916 | 85 | 83 | |
| Percent of Thatcher | | 104.7 | 103.9 | 101.7 | 103.8 | 100.0 | 97.6 | 96.9 | 101.4 | 102.5 | 100.1 | 101.2 | 101.4 |
| Hope x Thatcher ³ , IL-31-6 | 5 | 56.7 | 16.3 | 70.5 | .59 | 64 | 805 | 905 | 910 | 953 | 89 | 86 | |
| Thatcher | 5 | 55.2 | 14.8 | 69.9 | .53 | 63 | 783 | 894 | 925 | 952 | 87 | 78 | |
| Percent of Thatcher | | 102.7 | 110.1 | 100.9 | 111.3 | 101.6 | 102.8 | 101.2 | 98.4 | 100.1 | 100.4 | 102.3 | 102.1 |
| Pilot | 13 | 57.1 | 15.3 | 68.3 | .53 | 63 | 766 | 889 | 899 | 912 | 86 | 86 | |
| Thatcher | 13 | 55.8 | 15.2 | 68.7 | .52 | 63 | 780 | 881 | 901 | 916 | 85 | 83 | |
| Percent of Thatcher | | 102.3 | 100.7 | 99.4 | 101.9 | 100.0 | 98.2 | 100.9 | 99.8 | 99.6 | 99.7 | 101.2 | 100.6 |
| Merit x Thatcher, 1597 | 10 | 55.8 | 15.4 | 69.4 | .59 | 66 | 726 | 861 | 917 | 949 | 86 | 89 | |
| Thatcher | 10 | 55.6 | 14.7 | 69.7 | .52 | 63 | 778 | 883 | 909 | 929 | 87 | 81 | |
| Percent of Thatcher | | 100.4 | 104.8 | 99.6 | 113.5 | 104.8 | 93.3 | 97.5 | 100.9 | 102.2 | 98.6 | 102.3 | 101.0 |
| Ceres | 7 | 50.5 | 15.6 | 60.7 | .55 | 65 | 736 | 855 | 853 | 889 | 86 | 85 | |
| Thatcher | 7 | 56.7 | 16.0 | 68.2 | .53 | 63 | 774 | 869 | 881 | 897 | 85 | 85 | |
| Percent of Thatcher | | 103.2 | 97.5 | 100.7 | 103.8 | 103.2 | 95.1 | 98.4 | 96.8 | 99.1 | 97.4 | 101.2 | 99.9 |
| Marquis | 9 | 56.6 | 15.4 | 64.0 | .58 | 63 | 718 | 840 | 875 | 905 | 86 | 84 | |
| Thatcher | 9 | 56.9 | 15.9 | 68.9 | .53 | 63 | 775 | 869 | 889 | 911 | 86 | 84 | |
| Percent of Thatcher | | 99.5 | 96.9 | 92.9 | 109.4 | 100.0 | 92.6 | 96.7 | 98.4 | 99.3 | 97.0 | 100.0 | 97.1 |

Table 30. - (Continued)

| Variety or cross | No. of samples | Test weight per bushel (dockage free) | Crude protein of wheat (Percent) | Yield of flour (Pct.) | Ash in flour (Pct.) | Water absorption of flour (Percent) | Baking method and volume of loaf | | | | Grain texture 2/ | Crumb color 2/ | Average of 8 properties 3/ |
|-------------------------------|----------------|---------------------------------------|----------------------------------|-----------------------|---------------------|-------------------------------------|----------------------------------|-------|-------|-------|------------------|----------------|----------------------------|
| | | | | | | | No. 1 | No. 2 | No. 3 | No. 6 | | | |
| | | (Pounds) | (Percent) | (Pct.) | (Pct.) | (Percent) | (Cc) | (Cc) | (Cc) | (Cc) | (Score) | (Score) | |
| Vesta | 5 | 58.4 | 15.2 | 71.3 | .50 | 64 | 719 | 836 | 867 | 860 | 85 | 88 | |
| Thatcher | 5 | 56.5 | 15.1 | 68.9 | .48 | 63 | 752 | 868 | 890 | 901 | 85 | 85 | |
| Percent of Thatcher | | 103.4 | 100.7 | 103.5 | 104.2 | 101.6 | 95.6 | 96.3 | 97.4 | 95.4 | 96.2 | 103.5 | 100.4 |
| Merit-3 | 10 | 55.1 | 15.2 | 70.3 | .58 | 67 | 686 | 830 | 885 | 923 | 83 | 82 | |
| Thatcher | 10 | 55.6 | 14.7 | 69.7 | .52 | 63 | 773 | 863 | 909 | 929 | 87 | 81 | |
| Percent of Thatcher | | 99.1 | 103.4 | 100.9 | 111.5 | 106.3 | 88.2 | 94.0 | 97.4 | 99.4 | 95.0 | 101.2 | 99.0 |
| Rival | 13 | 57.8 | 15.3 | 70.8 | .55 | 65 | 703 | 830 | 850 | 889 | 86 | 86 | |
| Thatcher | 13 | 55.8 | 15.2 | 68.7 | .52 | 63 | 780 | 881 | 901 | 916 | 85 | 83 | |
| Percent of Thatcher | | 103.6 | 100.7 | 103.1 | 105.8 | 103.2 | 90.1 | 95.2 | 95.2 | 97.1 | 94.5 | 101.2 | 100.5 |
| Rel.-Hope x Comet-1121 | 4 | 59.6 | 15.2 | 70.9 | .49 | 63 | 693 | 831 | 833 | 887 | 81 | 85 | |
| Thatcher | 4 | 57.0 | 15.4 | 70.1 | .53 | 64 | 766 | 866 | 889 | 915 | 88 | 82 | |
| Percent of Thatcher | | 104.6 | 98.7 | 101.1 | 92.5 | 98.4 | 90.5 | 96.0 | 93.7 | 96.9 | 94.4 | 103.7 | 100.9 |
| Merit | 14 | 56.4 | 15.2 | 69.3 | .59 | 67 | 671 | 813 | 863 | 892 | 810 | 86 | |
| Thatcher | 14 | 55.9 | 15.1 | 69.0 | .52 | 63 | 766 | 869 | 895 | 910 | 860 | 85 | |
| Percent of Thatcher | | 100.9 | 100.7 | 100.4 | 113.5 | 106.3 | 87.6 | 93.6 | 96.4 | 98.0 | 94.2 | 103.6 | 98.9 |
| H-44 x Thatcher, 11-29-52 | 8 | 56.1 | 14.9 | 70.3 | .51 | 63 | 695 | 826 | 830 | 840 | 798 | 86 | |
| Thatcher | 8 | 55.2 | 14.5 | 69.3 | .50 | 63 | 763 | 874 | 906 | 917 | 865 | 85 | |
| Percent of Thatcher | | 101.6 | 102.8 | 101.4 | 102.0 | 100.0 | 91.1 | 94.5 | 91.6 | 91.6 | 92.3 | 98.9 | 99.8 |
| Mer. 2 x Comet-1017, Ms. 2822 | 9 | 57.4 | 15.3 | 71.8 | .52 | 64 | 684 | 817 | 854 | 880 | 809 | 86 | |
| Thatcher | 9 | 55.5 | 14.8 | 69.5 | .51 | 63 | 780 | 891 | 912 | 930 | 880 | 81 | |
| Percent of Thatcher | | 103.4 | 103.4 | 103.3 | 102.0 | 101.6 | 86.8 | 91.7 | 93.6 | 94.6 | 91.9 | 106.2 | 100.8 |
| Ceres-D.C. x C.H.F., Ms. 2839 | 10 | 60.0 | 15.4 | 71.0 | .54 | 63 | 703 | 827 | 833 | 849 | 803 | 90 | |
| Thatcher | 10 | 55.6 | 15.1 | 69.3 | .51 | 64 | 793 | 892 | 910 | 928 | 881 | 81 | |
| Percent of Thatcher | | 107.9 | 102.0 | 102.5 | 105.9 | 98.4 | 88.7 | 92.7 | 91.5 | 91.5 | 91.1 | 111.1 | 101.0 |
| Com.-1110 x H-44-Ceres, 1586 | 4 | 59.2 | 14.4 | 71.6 | .62 | 64 | 645 | 790 | 814 | 861 | 778 | 74 | |
| Thatcher | 4 | 57.0 | 15.4 | 70.1 | .53 | 64 | 766 | 866 | 889 | 915 | 859 | 82 | |
| Percent of Thatcher | | 103.9 | 93.5 | 102.1 | 117.0 | 100.0 | 84.2 | 91.2 | 91.6 | 94.1 | 90.6 | 90.2 | 95.0 |
| Premier | 13 | 59.7 | 15.4 | 71.0 | .57 | 66 | 647 | 777 | 800 | 822 | 763 | 83 | |
| Thatcher | 13 | 55.8 | 15.2 | 68.7 | .52 | 63 | 780 | 881 | 901 | 916 | 870 | 83 | |
| Percent of Thatcher | | 107.0 | 101.3 | 103.3 | 109.6 | 104.8 | 82.9 | 88.2 | 88.8 | 90.4 | 87.7 | 98.8 | 99.9 |

1/ Reciprocal percentage values used in computing averages of 8 properties.

2/ Average volume color and texture for 4 methods of baking (Nos. 1, 2, 3, and 6).

3/ The 8 properties are test weight, crude protein, flour yield, ash (reciprocal values), water absorption, and average volume, grain texture, and crumb color.

Comparable Samples, 1938 to 1941, Inclusive

The number of comparable samples tested with Thatcher, for each of the four years, 1938 to 1941, inclusive, and their total are shown in table 31, together with the average of the 8 properties. In this table the varieties are arranged in order of their weighted average percentage of Thatcher for the 8 properties. Table 32 further summarizes the results for all tests for each of the 8 properties, and also the volumes for each of the four regular baking methods.

Table 31. - Annual and total number of samples comparable with Thatcher, and averages of eight quality properties in percentage of Thatcher for the 4 years, 1938 to 1941, inclusive

| Variety or N.No. | Number of samples | | | | | Average of 8 properties | | | | Weighted average |
|---------------------|-------------------|------|------|------|-------|-------------------------|-------|-------|-------|---------------------|
| | 1938 | 1939 | 1940 | 1941 | Total | 1938 | 1939 | 1940 | 1941 | |
| II-31-9 | --- | --- | --- | 4 | 4 | --- | --- | --- | 103.8 | 103.8 |
| Renown | .2 | 3 | 6 | 13 | 24 | 99.5 | 98.8 | 100.8 | 101.4 | 100.8 |
| N.No.1520 | --- | 1 | 2 | 4 | 7 | --- | 101.3 | 100.2 | 100.9 | 100.8 |
| II-31-6 | --- | --- | 2 | 5 | 7 | --- | --- | 97.1 | 102.1 | 100.7 |
| Ns. 2822 | --- | --- | 3 | 9 | 12 | --- | --- | 99.7 | 100.8 | 100.5 |
| Ns. 2829 | --- | 2 | 9 | 10 | 21 | --- | 102.5 | 99.3 | 101.0 | 100.4 |
| N.No.1597 | --- | --- | 2 | 10 | 12 | --- | --- | 96.8 | 101.0 | 100.3 |
| Pilot | 8 | 11 | 14 | 13 | 46 | 102.0 | 99.2 | 99.3 | 100.6 | 100.1 |
| II-31-14 | --- | --- | 2 | 7 | 9 | --- | --- | 95.6 | 101.4 | 100.1 |
| Thatcher | 11 | 12 | 14 | 16 | 53 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Vesta | 8 | 6 | 1 | 5 | 20 | 102.0 | 96.8 | 99.9 | 100.4 | 99.9 |
| Rival | 8 | 9 | 9 | 13 | 39 | 103.2 | 98.1 | 96.6 | 100.5 | 99.6 |
| Regent | 2 | 4 | 7 | 10 | 23 | 99.8 | 96.5 | 97.0 | 101.6 | 99.2 |
| Ceres | 4 | 3 | 6 | 7 | 20 | 99.4 | 98.7 | 96.4 | 99.9 | 98.6 |
| II-29-52 | 2 | 3 | 5 | 8 | 18 | 97.8 | 96.2 | 98.1 | 99.8 | 98.5 |
| Merit-3 | --- | 1 | 2 | 10 | 13 | --- | 99.3 | 95.7 | 99.0 | 98.5 |
| Merit | .6 | 9 | 12 | 14 | 41 | 100.1 | 96.8 | 96.7 | 98.9 | 98.0 |
| Premier | .1 | 9 | 9 | 13 | 32 | 102.9 | 97.7 | 94.6 | 99.9 | 97.9 |
| Marquis | .2 | 4 | 8 | 9 | 23 | 97.6 | 98.2 | 95.4 | 97.1 | 96.7 |
| N.No.1596 | --- | --- | --- | 4 | 4 | --- | --- | --- | 95.0 | 95.0 |

Table 32. - Relative chemical, milling, and baking values of 20 varieties and strains of hard red spring wheat in percentage of Thatcher for the 4 years, 1938, 1939, 1940, and 1941, and weighted average

| Variety or N. number | Test weight | | | | | Variety or N. number | Crude protein of wheat | | | | |
|----------------------------|-------------|-------|-------|-------|---------|----------------------------|------------------------|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| Ns.2829 | ----- | 104.8 | 105.6 | 107.9 | 106.6 | II-31-9 | ----- | ----- | ----- | 112.8 | 112.8 |
| Premier | 106.2 | 104.2 | 103.0 | 107.0 | 105.1 | II-31-6 | ----- | ----- | 103.0 | 110.1 | 108.1 |
| Renown | 107.0 | 101.4 | 103.7 | 104.7 | 104.2 | II-31-14 | ----- | ----- | 101.2 | 108.2 | 106.6 |
| N.No.1596 | ----- | ----- | ----- | 103.9 | 103.9 | Regent | 106.0 | 103.1 | 102.5 | 106.8 | 104.8 |
| N.No.1520 | ----- | 100.3 | 103.7 | 104.6 | 103.7 | N.No.1597 | ----- | ----- | 100.0 | 104.8 | 104.0 |
| Vesta | 104.5 | 101.9 | 103.9 | 103.4 | 103.4 | Merit-3 | ----- | 111.9 | 98.8 | 103.4 | 103.3 |
| Ns. 2822 | ----- | ----- | 102.5 | 103.4 | 103.2 | Renown | 98.7 | 100.6 | 102.6 | 103.9 | 102.7 |
| II-31-9 | ----- | ----- | ----- | 102.7 | 102.7 | II-29-52 | 99.3 | 98.8 | 101.3 | 102.8 | 101.3 |
| Rival | 105.1 | 100.7 | 100.2 | 103.6 | 102.5 | Ns.2822 | ----- | ----- | 93.9 | 103.4 | 101.0 |
| Ceres | 102.1 | 102.5 | 98.4 | 103.2 | 101.4 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| II-31-6 | ----- | ----- | 100.0 | 102.7 | 101.9 | Pilot | 102.0 | 94.2 | 100.0 | 100.7 | 99.2 |
| Pilot | 100.9 | 100.0 | 100.5 | 102.3 | 101.0 | N.No.1520 | ----- | 98.5 | 100.0 | 98.7 | 99.0 |
| Regent | 101.5 | 97.0 | 98.6 | 102.7 | 100.4 | Ns.2829 | ----- | 97.6 | 95.6 | 102.0 | 98.8 |
| II-31-14 | ----- | ----- | 99.7 | 100.7 | 100.5 | Vesta | 100.0 | 94.7 | 100.0 | 100.7 | 98.6 |
| Merit | 101.5 | 99.1 | 100.2 | 100.9 | 100.4 | Merit | 100.6 | 95.5 | 96.9 | 100.7 | 98.4 |
| N.No.1597 | ----- | ----- | 98.8 | 100.4 | 100.1 | Rival | 100.0 | 94.2 | 97.5 | 100.7 | 98.3 |
| II-29-52 | 99.8 | 97.2 | 99.1 | 101.6 | 100.0 | Premier | 108.2 | 92.9 | 95.5 | 101.3 | 97.5 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | Ceres | 98.6 | 95.7 | 97.4 | 97.5 | 97.4 |
| Merit-3 | ----- | 98.0 | 99.1 | 99.1 | 99.0 | Marquis | 100.0 | 95.1 | 93.2 | 96.9 | 95.6 |
| Marquis | 100.0 | 100.7 | 96.1 | 99.5 | 98.6 | N.No.1596 | ----- | ----- | ----- | 93.5 | 93.5 |

| Variety or N. number | Flour yield | | | | | Variety or N. number | Ash of flour ^{1/} | | | | |
|----------------------------|-------------|-------|-------|-------|---------|----------------------------|----------------------------|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| Vesta | 104.0 | 102.8 | 105.4 | 103.5 | 103.6 | N.No.1520 | ----- | 131.2 | 107.7 | 107.5 | 110.9 |
| Ns.2822 | ----- | ----- | 103.0 | 103.3 | 103.2 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Rival | 105.5 | 102.7 | 99.4 | 103.1 | 102.6 | Pilot | 100.0 | 102.0 | 98.0 | 98.1 | 99.3 |
| Ns.2829 | ----- | 100.7 | 102.3 | 102.5 | 102.2 | Ceres | 102.0 | 96.2 | 101.9 | 96.2 | 99.1 |
| II-31-9 | ----- | ----- | ----- | 102.1 | 102.1 | Ns.2822 | ----- | ----- | 102.1 | 98.0 | 99.0 |
| N.No.1596 | ----- | ----- | ----- | 102.1 | 102.1 | Ns.2829 | ----- | 114.5 | 100.0 | 94.1 | 98.6 |
| Premier | 103.1 | 102.8 | 99.2 | 103.3 | 102.0 | Vesta | 100.0 | 97.9 | 96.0 | 95.8 | 98.1 |
| II-31-14 | ----- | ----- | 103.1 | 101.0 | 101.5 | Renown | 98.0 | 93.9 | 100.0 | 96.2 | 97.0 |
| Merit | 101.1 | 100.4 | 100.1 | 100.4 | 100.4 | II-29-52 | 98.0 | 96.3 | 94.3 | 98.0 | 96.7 |
| Renown | 101.1 | 99.9 | 101.0 | 101.7 | 101.3 | Rival | 103.9 | 96.0 | 92.5 | 94.2 | 96.2 |
| II-29-52 | 101.1 | 100.0 | 102.0 | 101.4 | 101.3 | Marquis | 100.0 | 98.1 | 92.5 | 90.6 | 93.4 |
| II-31-6 | ----- | ----- | 102.1 | 100.9 | 101.2 | Premier | 100.0 | 98.0 | 88.7 | 90.4 | 92.4 |
| Merit-3 | ----- | 99.2 | 102.1 | 100.9 | 101.0 | Regent | 96.0 | 88.7 | 84.6 | 96.2 | 91.3 |
| Regent | 100.9 | 98.4 | 100.0 | 100.9 | 100.2 | Merit | 96.0 | 96.0 | 88.5 | 86.5 | 90.6 |
| N.No.1520 | ----- | 100.1 | 101.1 | 101.1 | 101.0 | Merit-3 | ----- | 97.9 | 84.8 | 88.5 | 88.7 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | II-31-9 | ----- | ----- | ----- | 88.7 | 88.7 |
| N.No.1597 | ----- | ----- | 99.3 | 99.6 | 99.6 | II-31-14 | ----- | ----- | 73.9 | 92.3 | 88.2 |
| Ceres | 102.4 | 100.3 | 95.8 | 100.7 | 99.5 | II-31-6 | ----- | ----- | 76.1 | 88.7 | 85.1 |
| Pilot | 98.5 | 99.3 | 98.2 | 99.4 | 98.9 | N.No.1597 | ----- | ----- | 76.1 | 86.5 | 84.8 |
| Marquis | 100.0 | 98.3 | 94.2 | 92.9 | 94.9 | N.No.1596 | ----- | ----- | ----- | 83.0 | 83.0 |

Table 32. - (Continued)

| Variety or N. number | Water absorption of flour | | | | | Variety or N. number | Loaf volume, Basic method, No. 1 | | | | |
|----------------------------|---------------------------|-------|-------|-------|---------|----------------------------|----------------------------------|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| Merit-3 | ----- | 107.9 | 110.0 | 106.3 | 107.0 | II-31-9 | ----- | ----- | ----- | 106.1 | 106.1 |
| Merit | 104.2 | 106.0 | 106.9 | 106.3 | 106.1 | II-31-6 | ----- | ----- | 95.7 | 102.8 | 100.8 |
| N.No.1597 | ----- | ----- | 109.2 | 104.8 | 105.5 | II-31-14 | ----- | ----- | 95.1 | 102.3 | 100.7 |
| Premier | 108.0 | 105.6 | 102.8 | 104.8 | 104.6 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| II-31-9 | ----- | ----- | ----- | 103.2 | 103.2 | Pilot | 102.7 | 98.2 | 98.8 | 98.2 | 99.2 |
| II-31-6 | ----- | ----- | 105.4 | 101.6 | 102.7 | Renown | 92.1 | 89.9 | 100.3 | 97.6 | 96.9 |
| Rival | 103.9 | 100.5 | 102.2 | 103.2 | 102.5 | Regent | 94.9 | 89.5 | 95.8 | 97.7 | 95.5 |
| Ns.2822 | ----- | ----- | 104.5 | 101.6 | 102.3 | Ceres | 96.3 | 93.6 | 95.9 | 95.1 | 95.4 |
| II-31-14 | ----- | ----- | 103.1 | 101.6 | 101.9 | Rival | 101.8 | 93.6 | 88.3 | 90.1 | 92.9 |
| Ceres | 102.9 | 97.7 | 101.5 | 103.2 | 101.8 | Vesta | 95.7 | 86.4 | 92.0 | 95.6 | 92.7 |
| Regent | 100.7 | 99.1 | 100.6 | 101.6 | 100.8 | N.No.1597 | ----- | ----- | 88.0 | 93.3 | 92.4 |
| Vesta | 101.0 | 99.8 | 100.0 | 101.6 | 100.7 | Marquis | 94.3 | 94.2 | 90.1 | 92.6 | 92.2 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | II-29-52 | 89.0 | 88.3 | 91.5 | 91.1 | 90.5 |
| N.No.1596 | ----- | ----- | ----- | 100.0 | 100.0 | N.No.1520 | ----- | 88.6 | 89.6 | 90.5 | 90.0 |
| Renown | 100.0 | 99.7 | 98.8 | 100.0 | 99.7 | Ns.2829 | ----- | 96.1 | 89.4 | 88.7 | 89.7 |
| Pilot | 97.8 | 98.9 | 100.5 | 100.0 | 99.5 | Merit-3 | ----- | 93.4 | 81.5 | 88.2 | 87.6 |
| II-29-52 | 98.4 | 97.7 | 99.7 | 100.0 | 99.4 | Merit | 91.5 | 85.4 | 86.1 | 87.6 | 87.2 |
| Ns.2829 | ----- | 97.3 | 99.8 | 98.4 | 98.9 | Ns.2822 | ----- | ----- | 86.8 | 86.8 | 86.8 |
| Marquis | 100.0 | 94.8 | 97.1 | 100.0 | 98.1 | Premier | 102.2 | 84.8 | 84.1 | 82.9 | 84.4 |
| N.No.1520 | ----- | 96.8 | 97.7 | 98.4 | 98.0 | N.No.1596 | ----- | ----- | ----- | 84.2 | 84.2 |

| Variety or N. number | Loaf volume, Commercial method, No. 2 | | | | | Variety or N. number | Loaf volume, Commercial-bromate method, No. 3 | | | | |
|----------------------------|--|-------|-------|-------|---------|----------------------------|--|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| II-31-9 | ----- | ----- | ----- | 107.6 | 107.6 | Regent | 100.6 | 98.9 | 100.9 | 105.1 | 102.4 |
| Pilot | 105.5 | 101.0 | 100.9 | 100.9 | 101.7 | II-31-9 | ----- | ----- | ----- | 101.8 | 101.8 |
| II-31-14 | ----- | ----- | 97.7 | 101.9 | 101.0 | N.No.1597 | ----- | ----- | 99.0 | 100.9 | 100.6 |
| II-31-6 | ----- | ----- | 97.5 | 101.2 | 100.1 | II-31-14 | ----- | ----- | 98.9 | 101.1 | 100.6 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | Renown | 97.5 | 95.1 | 100.7 | 101.4 | 100.1 |
| Ceres | 102.0 | 96.8 | 95.3 | 98.4 | 98.0 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Renown | 95.0 | 91.9 | 98.7 | 98.9 | 97.7 | Pilot | 105.8 | 96.2 | 98.2 | 99.8 | 99.5 |
| Regent | 93.7 | 96.6 | 98.5 | 98.1 | 97.6 | II-31-6 | ----- | ----- | 98.2 | 98.4 | 98.3 |
| N.No.1597 | ----- | ----- | 96.1 | 97.5 | 97.3 | Merit-3 | ----- | 101.1 | 97.4 | 97.4 | 97.7 |
| Rival | 101.0 | 95.5 | 93.3 | 95.2 | 96.0 | Marquis | 96.5 | 92.6 | 92.6 | 98.4 | 95.2 |
| Marquis | 98.6 | 97.8 | 93.0 | 96.7 | 95.8 | Ceres | 98.6 | 92.3 | 90.5 | 96.8 | 94.6 |
| II-29-52 | 93.3 | 95.5 | 96.2 | 94.5 | 95.0 | Rival | 100.7 | 92.3 | 89.5 | 95.2 | 94.3 |
| Vesta | 96.0 | 91.5 | 95.0 | 96.3 | 94.7 | Merit | 96.3 | 90.3 | 91.3 | 96.4 | 93.6 |
| N.No.1520 | ----- | 93.6 | 92.1 | 96.0 | 94.5 | Vesta | 96.6 | 86.3 | 94.2 | 97.4 | 93.6 |
| Merit-3 | ----- | 96.3 | 90.5 | 94.0 | 93.6 | II-29-52 | 96.7 | 93.0 | 94.1 | 91.6 | 93.1 |
| Ns.2829 | ----- | 96.1 | 91.9 | 92.7 | 92.7 | Ns.2822 | ----- | ----- | 86.6 | 93.6 | 91.9 |
| Merit | 96.0 | 90.5 | 90.6 | 93.6 | 92.4 | N.No.1596 | ----- | ----- | ----- | 91.6 | 91.6 |
| N.No.1596 | ----- | ----- | ----- | 91.2 | 91.2 | N.No.1520 | ----- | 86.4 | 88.6 | 93.7 | 91.2 |
| Ns.2822 | ----- | ----- | 87.5 | 91.7 | 90.7 | Ns.2829 | ----- | 91.4 | 87.2 | 91.5 | 89.6 |
| Premier | 100.4 | 87.5 | 85.3 | 88.2 | 87.6 | Premier | 98.2 | 85.8 | 82.7 | 88.8 | 86.5 |

Table 32. - (Continued)

| Variety or N. number | Loaf volume, Commercial-bromate, malted wheat flour method, No. 6 ² | | | | | Variety or N. number | Loaf volume, Average for four methods | | | | |
|----------------------------|---|-------|-------|-------|---------|----------------------------|--|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| II-31-14 | ----- | ----- | 99.1 | 104.7 | 103.5 | II-31-9 | ----- | ----- | ----- | 104.6 | 104.6 |
| II-31-9 | ----- | ----- | ----- | 103.2 | 103.2 | II-31-14 | ----- | ----- | 97.7 | 102.5 | 101.4 |
| Regent | 109.8 | 100.1 | 99.9 | 105.0 | 103.0 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| N.No.1597 | ----- | ----- | 97.9 | 102.2 | 101.5 | Regent | 100.2 | 96.7 | 99.0 | 101.6 | 99.8 |
| Renown | 93.9 | 98.8 | 100.4 | 102.5 | 100.8 | Pilot | 102.7 | 97.5 | 99.0 | 99.7 | 99.5 |
| Merit-3 | ----- | 115.0 | 97.2 | 99.4 | 100.3 | II-31-6 | ----- | ----- | 96.8 | 100.4 | 99.4 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | Renown | 94.7 | 94.3 | 100.0 | 100.1 | 98.9 |
| II-31-6 | ----- | ----- | 95.9 | 100.1 | 98.9 | N.No.1597 | ----- | ----- | 95.5 | 98.6 | 98.1 |
| Pilot | 97.3 | 95.8 | 98.0 | 99.6 | 97.8 | Ceres | 98.1 | 93.5 | 92.7 | 97.4 | 95.5 |
| Merit | 100.3 | 93.3 | 92.6 | 98.0 | 95.7 | Merit-3 | ----- | 101.7 | 92.1 | 95.0 | 95.1 |
| N.No.1520 | ----- | 93.0 | 91.9 | 96.9 | 94.9 | Marquis | 96.7 | 93.8 | 91.4 | 97.0 | 94.5 |
| Ceres | 95.6 | 91.9 | 89.9 | 99.1 | 94.6 | Rival | 99.6 | 93.8 | 90.3 | 94.5 | 94.4 |
| Rival | 95.4 | 94.2 | 90.3 | 97.1 | 94.5 | Vesta | 96.5 | 87.7 | 93.9 | 96.2 | 93.7 |
| Marquis | 94.2 | 90.9 | 90.0 | 99.3 | 94.2 | N.No.1520 | ----- | 90.3 | 90.5 | 94.4 | 92.7 |
| N.No.1596 | ----- | ----- | ----- | 94.1 | 94.1 | II-29-52 | 93.2 | 91.8 | 93.7 | 92.3 | 92.7 |
| Ns.2822 | ----- | ----- | 90.9 | 94.6 | 93.7 | Merit | 96.3 | 89.9 | 90.5 | 94.2 | 92.5 |
| Vesta | 97.0 | 87.2 | 94.2 | 95.4 | 93.5 | Ns.2822 | ----- | ----- | 88.1 | 91.9 | 91.0 |
| II-29-52 | 92.9 | 90.2 | 92.5 | 91.6 | 91.8 | Ns.2829 | ----- | 92.6 | 89.3 | 91.1 | 90.5 |
| Ns.2829 | ----- | 87.7 | 88.8 | 91.5 | 90.0 | N.No.1596 | ----- | ----- | ----- | 90.6 | 90.6 |
| Premier | 93.7 | 87.8 | 82.8 | 90.4 | 87.6 | Premier | 98.2 | 86.5 | 83.7 | 87.7 | 86.6 |

| Variety or N. number | Crumb color, Average for four methods | | | | | Variety or N. number | Grain-texture, Average for four methods | | | | |
|----------------------------|--|-------|-------|-------|---------|----------------------------|--|-------|-------|-------|---------|
| | 1938 | 1939 | 1940 | 1941 | Average | | 1938 | 1939 | 1940 | 1941 | Average |
| II-31-9 | ----- | ----- | ----- | 111.8 | 111.8 | II-31-9 | ----- | ----- | ----- | 104.8 | 104.8 |
| N.No.1597 | ----- | ----- | 101.1 | 111.1 | 109.4 | N.No.1597 | ----- | ----- | 94.4 | 102.3 | 101.0 |
| Ns.2829 | ----- | 108.8 | 103.6 | 111.1 | 107.7 | II-31-6 | ----- | ----- | 97.8 | 102.3 | 101.0 |
| II-31-6 | ----- | ----- | 95.4 | 110.3 | 106.0 | Pilot | 104.6 | 99.9 | 97.9 | 101.2 | 100.5 |
| Ns.2822 | ----- | ----- | 104.5 | 106.2 | 105.8 | Renown | 98.4 | 101.4 | 98.9 | 101.2 | 100.4 |
| Vesta | 112.3 | 96.4 | 103.6 | 103.5 | 104.9 | Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Pilot | 109.5 | 101.7 | 100.1 | 103.6 | 103.1 | Ns.2829 | ----- | 103.4 | 97.8 | 101.1 | 99.9 |
| II-31-14 | ----- | ----- | 92.0 | 105.1 | 102.2 | N.No.1520 | ----- | 97.1 | 101.1 | 98.9 | 99.3 |
| Renown | 98.2 | 98.8 | 101.2 | 103.6 | 102.0 | Ns.2822 | ----- | ----- | 99.3 | 98.9 | 99.0 |
| Rival | 108.6 | 98.2 | 96.4 | 103.6 | 101.7 | Marquis | 91.1 | 100.8 | 98.9 | 100.0 | 99.0 |
| N.No.1520 | ----- | 95.9 | 100.0 | 103.7 | 101.5 | II-31-14 | ----- | ----- | 94.4 | 100.0 | 98.8 |
| Premier | 108.3 | 96.5 | 95.2 | 106.0 | 100.4 | Rival | 99.3 | 99.0 | 94.3 | 101.2 | 98.7 |
| II-29-52 | 100.0 | 93.8 | 98.8 | 103.7 | 100.3 | Ceres | 93.7 | 103.7 | 95.3 | 101.2 | 98.3 |
| Marquis | 92.6 | 104.2 | 100.0 | 100.0 | 100.1 | Vesta | 97.7 | 93.1 | 96.6 | 98.8 | 96.5 |
| Thatcher | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | II-29-52 | 92.9 | 94.1 | 95.5 | 98.9 | 96.5 |
| Regent | 97.5 | 95.7 | 97.7 | 103.7 | 99.9 | Regent | 95.8 | 93.5 | 93.3 | 98.9 | 96.0 |
| Merit | 106.0 | 94.1 | 96.4 | 103.6 | 99.8 | Merit | 94.7 | 93.6 | 94.3 | 98.8 | 95.7 |
| Merit-3 | ----- | 90.8 | 88.5 | 101.2 | 98.4 | Merit-3 | ----- | 86.9 | 89.9 | 97.7 | 95.7 |
| Ceres | 95.3 | 100.0 | 95.2 | 100.0 | 97.6 | N.No.1596 | ----- | ----- | ----- | 96.6 | 96.6 |
| N.No.1596 | ----- | ----- | ----- | 90.2 | 90.2 | Premier | 91.2 | 94.7 | 88.5 | 98.8 | 94.5 |

1/ Reciprocal percentage values used here and in computing averages for 8 properties.
2/ In 1938 the Malt-Phosphate-Bromate Method (No. 4) was used instead of Method No. 6.